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REPORT OF EIGHT CASES OF PURULENT MENINGITIS OPERATED UPON BY THE HAINES' METHOD. POST-MORTEM FINDINGS.*

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Probably no paper presented at the last meeting of our Society awakened more interest than that read by Dr. Haynes on drainage of the cisterna magna for the cure of acute meningitis. His procedure, carefully worked out on the cadaver, appealed strongly to all who heard the paper, as being entirely reasonable on surgical grounds, and as offering great possibilities as a curative measure in the treatment of that most fatal aural complication.

During the past year, drainage of the cisterna magna for suppurative meningitis has been on trial but the results are still unknown. The number of these cases that falls to one surgeon is so small that years would be required for any individual, on the basis of his own experience, to form a true judgment of the worth of the operation. If, however, we can have a report of the results of all the members present, the total number of cases will undoubtedly be large enough to enable us to place an approximately just value on this operation.

The writer has, during the last year, treated twelve cases of suppurative meningitis, nine of them by drainage of the cisterna magna. Two of these were secondary to lobar pneumonia, the infecting meningeal organism being pneumococcus; two followed fractures

*Read at the meeting of the American Laryngological, Rhinological and Otological Society, Washington, D. C., May 9, 1913.

of the base of the skull, involving the roof of the naso-pharynx, through which there was pneumococcic infection; five were of otitic origin, including two cases that had a purulent labyrinthitis, the organism being streptococcus pyogenes in three of these and a mixed infection in the other two. It is interesting to note that of four of these cases with streptococci in the meninges, two showed staphylococci among other bacteria but no streptococci in the pus from the ear and mastoid.

Feeling that early operation is an important factor in success in these cases, we tried to estimate the probable lapse of time between the invasion of the meningitis and operation. In case 1, a baby, the cisterna magna was drained thirty-six hours after the first signs of fretfulness, and twenty-one hours after the first convulsion. Case 5, with chronic purulent otitis media and acute labyrinthitis, under close observation in the hospital, with spinal fluid free from bacteria and temperature normal for two days, and without vertigo or pain, one afternoon at 2 p. m. had a chill and a temperature of 102°, and was operated upon at 4 p. m. In this case we believe that but a few hours intervened between the invasion of the meningitis and establishment of drainage. Case 4, also under hospital observation, was operated upon in from twenty-four to thirty-six hours after the onset of the meningitis. Case 3 was well advanced and in a hopeless condition when admitted to the hospital. The remaining five were probably in the third or fourth day of the disease when operated upon.

Special attention was given during the year to observation of the condition of the veins of the fundus and to the blood-pressure. The eye grounds were independently examined by two oculists of the hospital staff. In four cases that were under observation before the meningitis was diagnosed, this was done daily. In only one case was there any evidence of edema of the fundal veins. The blood-pressure was taken twice daily, always by the same person, and in no case could we demonstrate any constantly increasing pressure. In Case 5, where we believe we drained a few hours after the meningeal invasion, there was a steady fall in systolic blood-pressure for five days from 120, at the time of admission to the hospital when the cisterna magna was opened, to 105.

The length of time between operation and death varied widely, in the three cases operated upon early the interval was one, three and twenty-two days respectively; in those opened after three or four days of illness the interval was eighteen hours, thirty hours,

two days and four days; in the late hopeless case, three days. In the last case, the only one that recovered, the period of invasion was indefinite and the diagnosis not positively proved.

The establishment of free drainage for the cerebral fluid was without special difficulties, except in one case due to an unsuspected abscess of the right cerebellar lobe crowding that lobe across the median line. In seven cases the amount of fluid drained in twenty-four hours averaged about eight ounces. In one case, in which the dressings were weighed before being applied and again immediately on removal at the end of twelve-hour periods, there was a daily drainage of cerebral fluid of 11⅓ ounces for a period of eight days, no allowance being made for evaporation that may have occurred despite rubber-cap protection. This later on diminished to $2^{1}/_{10}$ ounces. A chemical analysis of this fluid was made by Professor Guthrie of the Medical Department of the University of Pittsburgh, who reported that it met all the requirements of normal cerebral fluid, and was not a serious transudate. In the case that recovered, there was an almost dry cisterna magna with a probable flow of not more than 2 or 3 ounces in forty-eight hours.

The symptoms present in seven of these cases were those characteristic of meningitis. In the two cases, however, where the meningitis was secondary to fracture of the base of the skull, there were extreme restlessness and later violent delirium requiring restraint in bed. These symptoms were not diminished by draining the cisterna magna. From the post-mortem findings, it was probable that in these cases reduction of the intra-cranial pressure had caused fresh bleeding from a ruptured vessel with the formation of a second blood-clot. In all cases but one, and this gave a dry tap, the diagnosis of meningitis was confirmed by lumbar puncture.

Subsequent to the operation in all the cases, except the two secondary to fracture of the base of the skull, there was a considerable deviation from the usual clinical course of suppurative meningitis, in that there was at first a definite period of improvement in their condition, evidenced by lessening or absence of headache, clearer mentality, loss of muscular rigidity, lower temperature and pulse. This stage was later followed, sometimes rapidly, but more often slowly, by the usual progressive sepsis, and finally ended in a deep septic coma, and death, apparently free from pain.

In duration, the period of improvement varied from a few hours in the worst cases to nine days in the most favorable cases. It is interesting to note that this period of improvement seemed to depend more on the virulence of the infecting organism than on the

duration of the meningitis before operation. Of the two cases operated upon early, in one the improvement lasted but a few hours and death followed in thirty-six hours. Culture gave an abundant growth of streptococcus pyogenes in twenty-four hours. In the other, where the improvement lasted nine days, two cultures were sterile after seventy-two hours, and a third, made from dressings packed in the wound, gave but a feeble growth after seventy-two hours. This inverse ratio between the virulence of the infection and duration of improvement was noted to a less marked degree in other cases.

Thus suppurative meningitis, treated by drainage of the cisterna magna, presents three well-defined periods: (1) the period of invasion; (2) the period of improvement; (3) the period of sepsis.

An explanation for this clinical course might be as follows: The cerebral fluid from its source in the lateral ventricles passes to the brain surface via the third and fourth ventricles and cisterna magna, thence through the dural spaces to disappear mainly into the venous circulation of the superior longitudinal sinus. In meningitis, as this fluid flows over the infected areas, it gathers the products of the infections and carries them in a steady stream into the venous circulation and this produces the relatively constant high septic temperature, characteristic of this disease. When the cisterna magna is opened, the fluid is diverted from its normal course and no longer passes over the infected brain surface, but leaves the skull at the cisterna magna, and the toxins are no longer washed into the circulation. This results in a fall of the temperature, the relief of the brain pressure, and the period of improvement. However, all the infection entangled in the meshes of the arachnoid spaces does not drain back to the drainage opening, and these remaining foci, nature is unable to overcome. The period of improvement will continue until absorption from these areas ushers in the period of sepsis. These three periods are clearly defined in the following case:

Case 1: E. G., aged 22, American, admitted to the Eye and Ear Hospital, November 18, 1912. Chief complaints—headache, vertigo, vomiting. On November 3, patient awoke from an afternoon nap. On sitting up in bed he was seized with extreme dizziness and vertigo; vomited at intervals; had constant but never severe headache; was confined to bed as he was too dizzy to walk. He had been hard of hearing in both ears, but the right, his best ear, which had been discharging at intervals for years, had become totally deaf since this attack. Never mastoid pain nor tenderness.

General Examination: Patient seemed perfectly rational and not particularly uncomfortable. Showed no traces of mental dullness, irritability, or inco-ordination. With eyes closed, considerable swaying but no tendency to fall in any definite direction. Knee jerks slightly exaggerated on both sides. Kernig's sign negative. Eye grounds negative, no blurring of the edges of the disc or fullness of the veins. Blood pressure: systolic 120, diastolic 60. W. B. C. 11,200. Polys. 74 per cent. Lumbar puncture, clear fluid under normal pressure, free from bacteria by smear and culture. Right ear showed complete destruction of drum and some pus in canal. Caloric test negative. C_4 heard faintly.

Temperature and condition improved until November 22. At 8 a. m. temperature was normal. At 2 p. m. patient had a chill and temperature 102°. Kernig's sign positive. Spinal fluid milky, but smears were negative. Cultures from centrifuged sediment sterile in various media.

Blood pressure record from time of admission, was: November 18, p. m.—Systolic, 120; diastolic, 60. November 19, a. m.—Systolic, 110; diastolic, 60. November 19, p. m.—Systolic, 115; diastolic, 60. November 20, a. m.—Systolic, 110; diastolic, 60. November 20, p. m.—Systolic, 105; diastolic, 60. November 21, a. m.—Systolic, 100; diastolic, 65. November 22, a. m.—Systolic, 105; diastolic, 60. After operation, 100 for several days.

Two hours after the chill the mastoid was opened. Bone was sclerotic, antrum filled with granulations and pus under pressure. Fistula led into a horizontal canal near ampulla; vestibule and canal opened and found to contain free pus. Cochlea apparently free from infection. Cisterna magna then drained.

The patient made a good recovery from operation. Twenty-four hours later temperature had not been above 100.4°. General condition good. No headache, Kernig's sign negative, no rigidity of neck. The improvement was much greater than indicated by the clinical chart. This improved condition continued for nine days with temperature ranging from 99° to 101°. Then on December 2 there was nausea and vomiting, frontal headache, steadily rising temperature during the day to 104° at 4 p. m., which fell during the night. On the following day this cycle was repeated with a chill, temperature reaching 105°. Fearing a septic sinus thrombosis, the sinus and an area of the temporal dura were exposed for temporal drainage if needed. The dura here presented a dry parchment-like appearance with no sign of fluid or moisture when opened. The

sinus was incised for one-quarter inch and found clear. This incision was then covered with a small pad without obliterating the sinus.

Patient was now in septic stage, with temperature ranging from 100° to 105° in the twenty-four hours, which cycle continued until death ten days later. During this time autogenous vaccine in doses from 50,000,000 to 75,000,000 were given without result. The day before the patient's death irrigation with normal salt solution at a temperature of 100° was carried out through a cannula in the lumbar spine, flushing the spinal canal out through the opening in the cisterna magna. This procedure removed a quantity of purulent material but did not benefit the patient. The drainage of cerebral fluid throughout the disease was free and abundant until the last few days. Four days after the operation, by careful estimation, it totaled 11⅓ ounces, but later diminished to $3^{8}/_{10}$ ounces. From December 10 the patient's condition became progressively worse, with onset of opisthotonos and delirium. Autopsy December 13, 1912, by Dr. Klotz, one hour after death.

Abstract from report of autopsy: "The dura was closely attached to the skull-cap, so that in removing the bone it was also cut through. In thus removing the skull-cap, it was found that a considerable space was present between the inner surface of the dura and the brain substance. The dura at the vertex was quite normal and it was observed that the surfaces of the hemispheres were unusually dry and free from fluid. The convulutions of the hemispheres showed no flattening and no evidence of compression. The sinuses of the dura were all clear and without any evidence of thrombosis. The right lateral sinus, which had been opened by operation, was found normal, and on the inner side no evidence of the operative incision into the sinus could be observed. There was no clotting at the point of incision. In the cisterna magna there was some slight evidence of inflammatory reaction and evidence of a little granular lymph was present near the opening. In the region of the right middle ear the dura appeared very shiny, but along the superior border of the petrous bone there was some injection of the fine vessels. There was, however, no evidence of lymph exudate over the petrous bone on either side. The anterior fossa of the skull was normal. Other than a slight congestion around the right petrous bone, the middle fossa was free from disease. The posterior fossa showed some inflammatory exudate at the base of the skull over the basilar process of the occipital bone and the body of the sphenoid. Here it was found that some yellow lymph was

present over the body of the occipital bone, as well as around the circumference of the foramen magnum and extending a slight distance over the portion of bone at the cisterna magna. Anteriorly the lymph exudate was present over the anterior and posterior clinoid processes, as well as over the diaphragm covering the pituitary body.

"*Brain*: The vessels of the hemispheres and cerebellum were considerably injected. The surface was dry. The hemispheres were otherwise fairly normal in appearance, save for a slight amount of yellowish exudate extending along the Sylvian fissure on the left side. This exudate could be followed along the fissure to the base of the brain. On the under-surface of the brain a considerable quantity of yellowish, elastic lymph was present from the optic commissure backwards over the crura, pons, medulla and the upper portion of the spinal cord. The exudate was most intense over the medulla and the adjacent parts of the cerebellum. The lobes of the cerebellum were otherwise free from any evidence of inflammatory lymph. There was, however, a little yellowish lymph around the brain stem, close beneath the occipital lobes. There was also a little lymph on the cerebellum just above the medulla. This latter area was opposite the point of drainage in the cisterna. The lymph that was present at the base of the brain was of such quantity that the basilar artery and the circle of Willis were completely covered.

"The striking feature that presented itself in connection with the brain was the localization of the exudate to the base with only a slight deposit along the vessels of the left Sylvian fissure. The cerebral and the cerebellar hemispheres were both free from an inflammatory deposit, except where this tissue bordered upon the structures at the base.

"The pituitary body showed some exudate along the infundibulum. The pituitary itself appear reddened.

"The petrous bone on the right side was opened and a yellowish-red exudate was found present in the semi-circular canals. There was, however, no evidence of exudate in the cochlea. This canal contained a clear watery fluid. The left middle ear was found quite healthy.

"*Bacteriology*: During life the cerebral spinal fluid was examined bacteriologically on several occasions. On November 18, 1912, fluid was obtained by lumbar puncture. The cell count of this fluid showed an excess number of polymorphonuclear leucocytes. No

bacteria were obtained either in direct smears nor in the culture made from this fluid.

"On November 22, 1912, some spinal fluid was again obtained, and at this time it was distinctly milky and a fibrin mesh-work developed in the fluid. Direct smears showed abundant leucocytes. No bacteria could be made out in the direct smears, nor were there any obtained in the cultures, though these were made on a variety of media.

"On November 25, 1912, materials were received from the mastoid, the labyrinth and the cisterna magna. Direct smears showed the presence of chains of gram-positive cocci in the material from the mastoid. In none of the other direct smears were bacteria observed. Cultures made from these materials from the different regions showed the following results: Mastoid, B. Proteus vulgaris, B. Plebius, streptococcus mitis. Labyrinth, B. Proteus vulgaris, B. Alkaligenes. Cisterna magna, M. Zymogenes.

"On November 28, 1912, some fluid which was aspirated from the cisterna magna was examined. Cultures of this fluid showed the presence of staphylococcus aureus alone.

"On December 10, 1912, fluid was obtained from the cisterna magna by injecting saline through a lumbar puncture. Cultures of this fluid showed the presence of the streptococcus pyogenes and the staphylococcus aureus.

"At autopsy a culture was taken from the fluid at the base. From this fluid the streptococcus pyogenes as well as a staphylococcus aureus was isolated."

Case 2: Our last case, diagnosed clinically as acute suppurative meningitis, recovered. The diagnosis, however, was never proved and is open to doubt. The patient, Martin, a foreigner, speaking an unusual Slavish dialect, was admitted to the Eye and Ear Hospital, February 2, 1913. History, indefinite from inability of interpreter to understand well, was of pain in left ear, headache, and dizziness for one week. General examination: Patient very restless and noisy at times; at others, stupid and semi-comatose. Temperature, 99°. Eye examination negative. W. B. C. 15,600. Polys, 74 per cent. Systolic blood pressure, 110. No cervical rigidity. Negative Kernig's. Negative caloric test. Lumbar puncture in six attempts gave absolutely dry taps.

Simple mastoid operation was done by Dr. Waldie. Extensive necrosis found. On following day there was no improvement. Patient was very restless and had severe head pains. Neck muscles

very rigid. Kernig's positive. Temperature, 103°. Neumann's labyrinth operation done. Pus and granulations found. No retro-labyrinthine abscess or dural necrosis. The cisterna magna was then opened with escape of a scant amount of cerebral fluid, about one ounce under no pressure. As the dressing was not moist from drainage, it was not changed for four days, during which time the patient did not improve, but continued very restless and noisy, requiring the use of morphin. When the dressing was removed about one ounce of thick, yellow pus escaped. After this the patient had an uneventful recovery extending over six weeks.

The interesting features of this case are: 1. Though the clinical symptoms were those of meningitis, the pulse did not follow the temperature typically, but remained generally at about 90°. 2. The dry tap from the lumbar puncture and scant amount of cerebral fluid. 3. Rupture of a cerebellar abscess through the operation wound. 4. The fact that the meningitis, if present, was probably circumscribed.

From the clinical observation of these nine cases, and the post-mortem findings, which presented in general the same pathological conditions, and differed only in the extent of areas involved, we are led to the following conclusions: Drainage of the cisterna magna hinders the development of a diffuse meningitis over the hemispheres, prevents the accumulation of inflammatory exudate in the subdural spaces, but appears to have no effect upon the accumulation of pus in the pia-arachnoid, and does not influence the progress of the infection at the base of the brain. The accumulation here was present in all of our post-mortems, extending from the optic commissure backwards over the crura, pons, medulla and the upper anterior portion of the spinal cord.

350 Winebiddle Avenue.

Case of Cerebellar Abscess of Otitic Origin Successfully Operated.

U. CALAMIDA. *Arch. ital. di. Otol.*, July, 1913, p 281.

Man of 31 years who suffered since childhood from otorrhea of right ear. Sudden attack of pain, vertigo, headache, paralysis of right facial nerve with increase of suppuration. Three months later operation at which a large cerebellar abscess was found. Recovery. The author discusses the symptomatology and states that the prognosis is doubtful. ED.

CONGENITAL ABSENCE OF BOTH EARS.

DR. R. C. LYNCH, NEW ORLEANS.

"Even Nature forgets" and yet in almost all of the instances of her unusual development or lack of development she has at least shown some effort toward the production of missing parts, or the reduction of accessory parts, but in the instance reported here she has actually forgotten entirely the development of a single vestige of any part of either ear, not even condescending to place a piece of cartilage that might represent the external ear or the Eustachian tube.

Figure 1.

Master C. is 12 years old, the seventh child from a father and mother in whom absolutely no consanguinity exists, and whose other six children are perfectly normal. Although hailing from a section of our state where deaf mutes are frequent, there exists in this family no such trace, as far back as the grand-parents. The parents were about 33 years of age at the birth of this boy, and the mother could not even find a superstitious reason to account for the peculiar anomaly.

Externally, the skin covering the lateral surface of the face and head is as smooth as can be imagined, the ramus of the jaw is normal, and there is simply a slight depression where the skin passes

from the zygoma and ascending ramus of the jaw to the remnant of the mastoid. Even by palpation one can find no evidence of a pitting in the skull surface. The glenoid fossa, seemingly, is developed on the anterior face of the mastoid process; the right half of the body, face, arm, hand and lower extremity are larger than the left, and the corresponding slightly more prominent. In the naso-pharynx there is the same lack of evidence of development. Examination of this region was made, first, by the usual method of posterior rhinoscopy which revealed simply the presence of a moderate amount of adenoid tissue, no prominence of the Eustachian tube, no evidence of even an eminence, the lateral wall of the naso-

Figure 2.

pharynx being perfectly smooth, and of course no fossa of Rosenmueller. With a palate retractor and the Hays' pharyngoscope a beautiful view was obtained of the epi-pharynx but on neither side could we see any evidence of an Eustachian tube.

The mother maintained that this patient would imitate chickens and cows, would dance with joy when the piano was played and would run to the river bank when the steamboats whistled. He gave absolutely no clue to hearing with the tuning-forks or with any form of extraneous noise I could devise to make. I felt, however, justified in exploring this region for a remnant of an ear, so a skin incision was made where the mastoid should have been. On peeling the periosteum away we found the temporo-maxillary joint instead of a canal, and behind this there was the smoother outer table

that one sees on the squamous region of the temporal bone. The facial nerve came out of the skull just behind the neck of the maxillary articulation, without any evidence of a styloid process. The outer table was clipped off, and revealed diploca; so following Politizer's advice, it was decided not to proceed further. While the patient was still under the anesthetic, a careful digital examination of the naso-pharynx was made but we could feel no more than we saw.

The illustrations, unfortunately, are poor, being the efforts of a novice. The plates and prints are not retouched. The black dimple seen in Figure 2 is not a cavity or pit to represent the ear canal, but the space in shadow between the ramus of the jaw and the base of the rudimentary mastoid process. The skin over this region is very smooth and free from the slightest vestige of a remnant of an external ear.

I could develop no nystagmus by ethyl chlorid, an ice bag or hot poultices to the side of the head, nor could I elicit any reaction by the turning test. Unfortunately an x-ray was not made at the time of this observation, but from the above it would be safe to conclude that the internal ear shared the same fate as the external and middle portions.

Many reports have appeared in the various text-books and current literature dealing with various deformities and remnants of the hearing apparatus, but this is the only instance I am able to find where there is absolutely a complete absence of the entire organ of hearing on both sides in the same individual, and it is because of this curiosity that it is reported.

624 Gravier Street.

Salvarsan in Otiatrics. J. LANG. *Deut. med. Wchnschr.*, No. 9, 1913.

In five cases of hereditary lues salvarsan was employed because of the continued disturbances in the hearing. One case remained unchanged; in one the improvement was temporary, two became worse, and one improved. ED.

EDELMANN'S ACOUSTICS FOR OTOLOGISTS.*

DR. J. HOLINGER, CHICAGO.

When we stop to compare the clear optical principles on which the ophthalmologists base their therapy, with the indefinite knowledge of acoustics which we have at our disposal, a book like that of Edelmann on "Acoustics for Otologists" will be a welcome, or rather, a necessary addition to our library. Edelmann dedicates the book to the memory of Bezold, and I believe that a great deal of the criticism of Bezold's work would have been avoided if the principles of acoustics had been taken into consideration earlier. It was a great satisfaction to see how the unbiased American student at once grasped the importance of Bezold's teachings. Wherever there was reserve or opposition it was easy to trace the cause to influence from abroad. The German student, who, in his preparatory studies, is steeped in Latin and Greek, is and was ill-prepared for the mathematical and physical questions involved. Permit me to cite from literature one example of this kind. A certain German professor, in order to prove that the handle of an ordinary tuning-fork does not vibrate longitudinally while the prongs vibrate transversely, screwed the handle in a vise, and with the microscope watched some grains of lycopodium powder that he had poured on the stem. Of course, he did not see any longitudinal vibrations, for this reason: Suppose you want to study the wagging of a dog's tail, by taking hold of his tail with both hands. The consequence will be, if the dog does not bite you, that the tail will wag the dog. Yet this and a number of other equally absurd mistakes did not baffle the professor, but induced him to write a lot of unscientific general and indefinite criticisms which certainly hurt Bezold's feelings, but did not shake the logic of his deductions.

One reason for bringing this up here is the fact that a number of our American colleagues mistook the absence of an answer to many of these criticisms, and especially of an answer in the same offensive tenor, for an admission of the weakness of Bezold's arguments, whereas, it was simply the answer of a scientist and a gentleman. Whenever he considered an answer necessary in the interest of the cause, he gave it in a scientific, never in an aggressive manner. Another reason for mentioning this matter here is

*Read at the meeting of the Chicago Laryngological and Otological Society, December 19, 1911.

that it caused Edelmann to publish the proofs for his and Bezold's theory of vibration of tuning forks; so it's an ill wind, etc.

The first chapter of Edelmann's book explains the transverse and longitudinal progressing vibrations and the standing vibrations. The transverse progressing vibrations may be produced by striking a tight rope near one end, longitudinal progressing vibrations by letting a slightly stretched spiral spring snap back. The natural harmonics of the violin string are given as an example of standing longitudinal vibrations.

The next chapter explains a number of technical terms, and then shows how we can represent vibrations by drawings, and finally mentions the phonograph as the most accurate instrument for this purpose.

Then follows a discussion of clear tones, their strength, pitch and the interval between two tones, the gauging of a normal tuning fork, and finally the number of vibrations of the different sounds in Bezold's tone series.

The phenomenon of the interference of two simultaneous sounds is given in the following chapter. After this, the mechanism of the tuning fork is discussed. There are three kinds of tuning forks: (1) the simple horseshoe-shaped steel rod with the same rectangular section throughout; (2) the fork with the heavy mass of steel at its arch; (3) the fork with weights. Proofs that a symmetrically constructed fork must show longitudinal vibrations of the handle when the prongs vibrate transversely is given theoretically by constructive drawings, and practically by five different experiments. Considerable space has been given these points because they are of utmost importance in the Rinné and Weber-Schwabach tests. You have often heard the argument that in Rinné's test we compare things that cannot be compared, namely longitudinal vibrations of the handle with transverse vibrations of the prongs of the tuning-fork. Gentlemen, we compare the *time* of the vibrations and here you have the proof that the *time* of vibration of the handle is identical with the *time* of vibration of the prongs; as long as the prongs vibrate transversely the handle must vibrate longitudinally. The matter is very important and I wish to illustrate it by an example: Suppose there were a steam car-line and an electric car-line from here to Milwaukee, I know that the steam car takes exactly the same length of time to make a certain distance as the electric car does. Yet I find that the steam car always arrives in Milwaukee ahead of the electric car. Now then, doesn't that give me a right to draw the conclusion that the

electric car-line either makes a detour, or makes more and longer stops. And in drawing this conclusion do I compare an electric car with a steam car? I do not think so, I only compare the time it takes them to get to Milwaukee. I might as well take two steam cars for the experiment, provided that the crew that runs over the tracks of the electric car has the same instructions as the crew on the electric car. At the end of this chapter proof is given that the transverse vibrations of the handle are due to asymmetry of the metal of the fork.

A very interesting chapter is devoted to the construction of tuning-forks free from overtones for the Rinné and Schwabach tests. It begins with a discussion of the production of overtones. It was through an accident that the possibility of eliminating them was discovered. Bezold had an "A" fork free from overtones which Edelmann with the best of machinery could not duplicate, although Bezold's fork was made by a simple locksmith and by hand. It seemed like the same problem as with the old Italian violins which cannot be imitated. The explanation came with the discovery of a tuning-fork that did not sound at all when held in the usual way, by the handle. Any fork when laid down so that both prongs and the handle are supported by two pieces of wood, will sound if struck in the middle. Edelmann calls this sound "Plattenton," because it is produced in the same way as that of a steel plate. If ths sound is accidentally the same as the sound of the prong unsupported, these two sounds kill each other since, according to Pisko, one sound is by resonance transformed into the other and then muffled by the hand. The fork is mute. This principle is used to eliminate the overtones. If this second sound is identical with the first and strongest overtone (usually the fifth of the fundamental tone of the prongs), we have a tuning-fork without weights which is for all practical purposes free from overtones. Such a fork will also sound a long time. Bezold's original "A" fork accidentally fulfilled this requirement.

The chapters on Bezold's series of tuning-forks offer no new feature for discussion here except that in the lowest forks where adventitious sounds are the most objectionable, the sound of the handle is eliminated by constructing the weights of the prongs asymetrically; thus excluding the possibility of a vibration of the handle. The gauging of the Galton whistle proved a very hard task, but was accomplished by means of Kundt's dust figures. The first whistles were not accurate and Edelmann freely admits this. He has constructed a new one. The chapter on Melde's sounding-

plates and Koenig's rods I shall skip, as I think they are only theoretically important. The monochord produces longitudinal vibrations, and it seemed for a while as though it were destined to replace the Galton whistle in our hearing-tests of the highest sounds. But, according to Edelmann, it produces so many adventitious noises in the highest pitch, for which it is the most important, that its value there is questionable.

A chapter on a continuous series of resonators to increase the strength of the sounds and to differentiate the clear sounds is not of sufficient practical value to us here.

Of much greater value are the chapters on rational and objective measuring of the strength of sound and the possibilities of hearing. A general discussion on how to measure anything gives us an insight into principles otherwise foreign to us but in which Edelmann is authority, since I know that in his laboratories his specialty is the manufacture of the finest apparatus for measuring magnetism, electricity, etc. We, therefore, have to take his word for it if he tells us that an enormous apparatus is necessary for measuring the strength of a sound. The principle, in short, is this: a normal siren with a certain number of holes of a definite diameter is turned by a motor having a certain number of revolutions. A current of air is blown with a known pressure against the holes. On account of the extreme sensitiveness of the ear this pressure is often as small as .01 mm. of water. Therefore a special apparatus, a micrometer for air-pressure with mirror and telescope, had to be constructed to measure this pressure with an accuracy of .0001 mm. Edelmann took a series of measurements on his own ears and found that the ear is most sensitive to musical sounds, less so to the lowest sounds and to sounds above c3. The quantitative measurements with this accuracy have, of course, only scientific value, but they show the difficulties we have to face when we want to talk about accuracy. Edelmann proposes as the unit of sound that strength of sound which is created in a normal siren blown against with a current of air whose pressure equals the pressure of a column of water of .1 mm. in height. He calls this unit "Phon" (1 "Φ") and always adds in parenthesis the pitch of the tone measured. He takes the unit so small in order to avoid decimals. 1Φ is, of course, different for each pitch. 2Φ is not necessarily twice as strong or is not necessarily felt twice as strong as 1Φ. The laws of increase have to be studied first. While these instruments cannot be used directly, they are used for gauging handier instruments for practical use.

Edelmann offers gauged tuning-forks that are suspended from an

elastic handle and have a contrivance which indicates the moment the prongs have attained a certain excursion. With a stop-watch we note the number of seconds from that moment till the patient does not hear the sound any more. The sound is conducted to the ear through a tube of a certain length and width. A table of figures accompanies each of these forks giving the number of phones of hearing corresponding to each second that has elapsed from the moment of the known excursion till the sound is no longer heard. This gives us figures by which we can not only make a comparison of our own results of hearing-tests made at different times, but can also compare them with the results of others. Of course, only the number of phones of the same pitch can be compared, but each fork has to be separately gauged, since the steel differs. It takes a series of these forks of different pitch to test the whole scale.

In order to measure the pressure with which an "A" fork is set on the vertex of a patient in the Weber-Schwabach test, Bruenings' handle is advised which indicates directly the pressure used. This seems to be a great advantage.

The last chapter treats of the construction and the use of a mechanically accurate model of the middle ear, enlarged twenty-two fold. It also serves to measure the proportion in which movements of the tympanic membrane are transmitted to the fluid of the labyrinth. Helmholtz felt the need of such a model. Politzer and Helmholtz began the study in detail of the movements of all parts, but it was Bezold who gave the logical explanation of the whole apparatus by showing that whenever any part of the whole mechanism is out of order, hearing for the lowest part of the sound scale is lost, while hearing of the upper octaves is little or not at all impaired. This changed the general question of the physiology of the whole apparatus, and brought forth the solution which is given at the end of the book and which appears just as clear and simple as it is surprising. In the study of the whole proposition it becomes evident that this solution could only be found by the happy combination of a careful observer and deep thinker such as Bezold with a practical physicist and eminent mathematician as Edelmann. I may say that the construction of this model was the greatest care of the last months or year of Bezold's life, and when Edelmann finally, after many unsuccessful attempts, succeeded and the result could be deducted, Bezold considered his life's work finished. From actual measurements and calculations it was found that movements of the handle of the hammer of 24° will cause movements of 1° on the foot-plate of the stirrup. The final paragraph

of the book says: "The conclusion of all the foregoing considerations allows us to answer the question, in which ratio are vibrations of the tympanic membrane transmitted to the fluid in the labyrinth" in the following manner: "In the inverse ratio of the specific gravity of the vibrating media."

In closing, I wish to add that this work of Edelmann is a collection of papers that appeared in different journals. My paper was written with the object of drawing your attention to the book, and not giving a full account of its contents. A number of interesting facts I could not touch upon at all. This book is another stone of the building of modern otology, for which Bezold furnished the normal and pathologic physiology, Siebenmann the pathology.

64 Randolph Street.

Pyelitis and Otitis Media in Infants. F. GLASER and H. FLIESS, *Deut. med. Wchnschr.*, July 24, 1913.

Apropos of three cases the authors remark that otitis media very often accompanies or precedes pyelitis. When the fever continues it should be suspected even though there are no manifest symptoms. In a case of colon-bacillus pyelitis paracentesis resulted in cure.

ED.

Local Autogenous Temperature Variations a Cause of Labyrinthine Vertigo. E. P. FOWLER, *Med. Rec.*, June 21, 1913.

In a preliminary report on this intricate symptom the author offers a rather plausible explanation. The bony labyrinth walls are only relatively good conductors of heat and being surrounded by poorly conducting bone and tissues of high specific gravity it follows that they are quickly affected by changes in temperature. Portions of the static labyrinth are near the surface of the body, and it follows that localized inflammations, congestions or anemias may bring about variations in temperature and that these variations near the labyrinth will affect the flow of the endolymph and if of sufficient intensity will cause vertigo and other similarly produced phenomena. These conclusions are in accord with the author's clinical observations. A fuller report of the above investigations will appear in the future.

LEDERMAN.

CAVERNOUS SINUS THROMBOSIS: REPORT OF A CASE.

DR. RICHMOND MCKINNEY, MEMPHIS, TENN.

Mrs. McE., a resident of Memphis, aged 31, was seen by me October 5, 1912, in consultation with Dr. W. J. Wadlington. This history was obtained:

About a year ago she was treated by a local colleague for antrum trouble. The nasal wall was perforated and the antrum irrigated on several occasions. She was apparently relieved by this treatment. About four or five days ago, following a severe head-cold, she developed pain all over the right side of the face and above the right eye, accompanied by considerable swelling, and foul-smelling pus occasionally was discharged from the corresponding naris. Temperature course 100.5° to 103°. This morning the swelling was apparently somewhat less, but the pain was very severe, requiring morphia hypodermically.

I found Mrs. McE. to have considerable swelling of the tissues of the right cheek, above the antrum, and also above the right eye. The right upper lid was swollen to such an extent as to completely close the eye, and showed bluish congestion, indicating blood stasis. Her pulse was rapid, and temperature 100°. Pus was discharging from the right antrum. Pressure anywhere over the right side of the face and above the corresponding eye elicited complaint of pain from the patient.

The picture presented was typical of cavernous sinus thrombosis. The treatment consisted of an ice-pack continually applied, and 2 per cent cocain spray, and frequent irrigation of the right naris with warm satuated solution of boracic acid.

The temperature rose that afternoon to 103.5°, and the pain continued to be excruciating. Morphin hypodermically was freely used for relief of this. The next morning the temperature was down to 100.5°, but up again in the afternoon to 104°. Practically the same course was run the next day. When her temperature would rise she would be more or less delirious. Four days after I first saw her, Mrs. McE.'s temperature was normal, and she expressed herself as feeling better than she had at any time since the attack began—in fact, I may say that she was in a state of euphoria. A short while after I saw the patient, her temperature began to rise,

and delirum rapidly developed with coma and death at 4.15 in the afternoon.

Cavernous sinus thrombosis is not at all a common condition, and is almost invariably fatal, the mortality in such cases being very high. Ballenger, in the last edition of his text-book, reports three cases, which he says is an unusually large number to come to the hands of one observer, as many clinicians engaged in nose, throat and ear work never see a case of this character. This will convey some idea of the rarity of the condition.

Memphis Trust Building.

Injurious Effects of Loud Noises on the Organ of Hearing. HARRY FRIEDENWALD, *Bull. Med. and Chir. Fac. of Md.*, Jan., 1913.

Friedenwald reviews the various forms of profession deafness and details the changes which take place in the organ of Corti, experimentally found by submitting animals to various sounds for a number of hours daily. He concludes that since the injurious effect of loud noises, sudden or continuous, has been demonstrated by clinical experience and experimental study, the protection of the hearing demands the reduction of loud noises wherever possible.

ED.

Connection of the Sexual Apparatus with the Ear, Nose and Throat. V. DABNEY, *N. Y. Med. Jour.*, March 15, 1913.

After discussing this subject very thoroughly and reporting eight interesting cases, Dabney concludes that there is a far greater connection than is supposed between the sexual apparatus and the ear, nose and throat. Cases escape diagnosis in whom this sexual element is the contributing, if not exciting cause of many of the common nasal and aural abnormalities of function, because of the lack of time and the difficulty in obtaining proper information.

ED.

UNUSUAL CASE OF MENIERE'S DISEASE ASSOCIATED WITH NEPHRITIS.

DR. A. L. GUTHRIE, LANCASTER, OHIO.

Patient, male, aged 43, of robust type; occupation, dentist. Family history negative. Previous History: Patient complained of a heavy feeling and soreness over kidneys for one year or more, which he attributed to being on his feet most of the day. Six months previous to present attack he noticed a general nervousness and insomnia. Urine has been diminished in quantity and concentrated for fully one year; habitual constipation since boyhood. On December 12, 1912, patient noticed that he would become dizzy when turning suddenly—either to right or left. This dizziness would only last a few seconds and no importance was given to it by the patient.

These attacks became more frequent and the vertigo more prolonged up to February 15, 1913, when he had a more severe attack of vertigo accompanied by nausea—according to the patient, this attack was caused by rising suddenly from a chair. Following the last-named date, he would become dizzy almost every day, upon sudden turning or stooping.

Present Attack: During the noonday meal on March 30, 1913, he developed a tinnitus aurium in the left ear similar to that experienced after taking quinin. This came on suddenly and became progressively worse during the meal. Before arising from the table he became dizzy and had some difficulty in leaving the table, after which he reclined in a Morris chair and during that afternoon any attempt to arise would cause a marked increase in the dizziness and tinnitus, and also some nausea. The same evening he vomited three or four times (accompanied by nausea and retching) which slightly relieved the dizziness. He was scarcely able to ascend to his bedchamber although assisted by his wife and son. Spent a very restless night; sleeping very little.

The following day I saw the patient for the first time. Upon examination I found the hearing in left ear practically nil—bone-condition no better than air-conduction. Both low and high registers equally impaired. Rinne and Weber tests negative. The membrana tympani was normal and the Eustachian tube permeable. Inflation had no effect upon the hearing, or upon the tinnitus which

was very marked. Vertigo very pronounced; patient could not raise head from pillow without dizziness and nausea. Nystagmus only apparent when eyes were rotated to extreme right—chiefly horizontal in type. All other cranial nerves normal.

The following day all symptoms aggravated. Conjunctiva was highly injected, vision blurred, retina slightly inflamed. Urinalysis: Cloudy, amber, acid, Spc. gr. 1024. Hyaline and granular casts—large quantity of albumen.

The third day the general condition was worse. Pulse 110, hard and bounding; temperature 101°; respiration 22; patient very drowsy. The fourth day the patient was slightly improved; vision still blurred; aural symptoms the same; not so drowsy and mentally brighter. Each day following showed a gradual improvement, albumen disappearing in ten days. Ocular and aural symptoms gradually returned to normal. Patient able to leave bed in four weeks; in six weeks he was able to come to my office. At this time the hearing had greatly improved; the low registers being more appreciable than the high; tinnitus much reduced in severity. Vertigo only manifest when stooping or turning suddenly; no nystagmus present.

August 5, 1913: All aural symptoms have disappeared completely with the exception of a slight impairment of hearing (not more than 20 per cent impairment, high and low registers equally impaired).

The treatment was as follows: The first day I gave a saline purgative, pilocarpin hypodermatically, hot blankets, hot lemonade and plenty of water internally; milk diet. This was continued for three days when the pilocarpin was discontinued—the remainder of the treatment was continued until the albumen had disappeared. After three weeks I gave iodalbin 10 gr. t. i. d. for a period of three months.

I consider the case unusual as to premonitory symptoms, onset, and recovery, considering the severity of the attack.

Kirn Building.

UNTOWARD RESULTS FOLLOWING THE EXTERNAL OPERATION ON THE FRONTAL SINUS. A CRITICAL REVIEW OF TWENTY CASES.*

DR. ROSS HALL SKILLERN, PHILADELPHIA.

Less than two years have elapsed since Boenninghaus collaborated and published the unfortunate results of the Killian operation. He laid, however, especial stress upon the fatal terminations, and did not enter into the detail of those sequelae which were not dangerous, but could readily be of temporary annoyance and even actual permanent discomfort to the patient. It is these very end-results which I have the honor to bring before you for your consideration this afternoon, taken from all the cases which have come under my care. In each one of these the Killian procedure had been followed.

Before entering into individual cases, let us consider the untoward conditions which may follow the operative procedure: 1. Edema of eyelids, particularly the superior. 2. Paralysis of the upper lid. 3. Continuation of the discharge. 4. Fistula or abscess formation. 5. Hemi-cranial anesthesia. 6. Neuralgia: (*a*) local, (*b*) hemicranial. 7. Deformity: (*a*) sinking in of forehead, (*b*) contraction of scar, (*c*) falling out of eyebrows, (*d*) excessive growth of eyebrows, (*e*) excessive growth of scar-tissue (keloid). 8. Formation of pneumatocele. 9. Temporary and permanent diplopia. 10. Blindness on operated side.

1. *Edema of the Eyelids*: This occurred in every case, beginning from two to four days after the operation. The duration and extent of the edema depended upon the amount of bone-resection required for the inferior wall. Thus the more extensive the resection, the longer the duration of the edema. Pressure and traction upon the eyeball exercised no little influence upon the prompt appearance of the turgidity, as was exemplified in our earlier cases when the optical structures were subjected to more or less traumatism due to our imperfection of finer technic. Since using a specially designed eye protector, the subsequent edema has not appeared so promptly, neither has it been so well-marked nor persisted so long.

*Read at the meeting of the International Congress of Medicine, Section on Laryngology, London, August 6, 1913.

As a general rule the edema appears at the end of the forty-eight hours, and reaches its greatest maximum on the fourth or fifth day. This gradually subsides, requiring often three or four weeks before the last traces disappear. Care should be taken not to confuse a partial ptosis with a persistent edema. Where considerable traumatism has occurred from the orbital retractor, the swelling appears on both the upper and lower lids, while the upper lid is alone affected from the supra-orbital incision, which has of course severed the main return-channels of the venous blood.

Pathological importance cannot be attributed to this edema unless it assumes such proportions as would lead one to believe breaking down and suppuration were imminent; such an eventuality, however, has not as yet come under our observation. In one case (with tubercular history) the edema has persisted, sometimes involving the entire forehead, but more often being confined to the upper eyelid of the operated side. Curiously enough, this edematous swelling is recurrent in type, one day practically disappearing only to suddenly reappear without any apparent cause. The possibilities of an angio-neurotic type might be considered in this connection.

2. *Paralysis of the upper lid*: Immediately after the operation this condition was always present, but as it co-existed with the edema it was difficult to judge whether it was due to trophic or mechanical disturbances. In only two cases did it show any disposition to become permanent. The ptosis here is not well-marked and does not include the entire lid, but only a portion of its internal edge.

3. *Continuation of the discharge*: The length of time the discharge continues from the affected nostril will depend largely upon the extent of the surgical intervention. Thus, if the frontal sinus be small, and only the anterior ethmoid cells co-affected, the purulent outflow will be practically *nil*, and entirely disappear at the end of two or three weeks. If, on the other hand, it has been necessary to completely eradicate the ethmoid labyrinth and resect the anterior sphenoidal wall as well, we can confidently expect a discharge for weeks and even months, which gradually diminishes both in amount and purulent consistency, until a thin serous or sero-purulent secretion remains. This appears to continue indefinitely, despite frequent applications of the various silver preparations, as has been observed in about 50 per cent of our cases.

It must be emphasized that the post-operative discharge can hardly be compared with the original condition, that it is at first the secretion from a wounded surface, and, even though it become semi-

purulent, stagnation is impossible, thereby eliminating the danger and previous discomfort to the patient.

4. *Fistula or abscess formation*: These may be classed as primary and secondary. Primary, those appearing before healing of the parts has occurred; secondary, those resulting from reinfection and appearing long after the external incision had healed. These happened in five of our cases. Two formed fistulas during the process of healing, and three became reinfected, which resulted in abscess-formation along the line of the original incision.

In the first case of primary fistula formation the sinus was very large, extending well up toward the vortex. During retraction the skin was torn, and a fistula formed below and above the ridge of bone. This necessitated packing with iodoform gauze, and the parts healed by granulation, the entire process requiring about one month.

The second occurred at the outer corner of the wound in a large sinus which extended to the maler bone, and was due to stagnation in this part. The insertion of iodoform gauze-drains soon brought about healing.

The three cases of abscess-formation occurred five weeks, eight months, and eleven months after operation. The first one was due to a piece of buried silkworm gut. No definite cause could be assigned to the others. It would appear that the longer the primary sutures are allowed to remain after the healing process has well begun, just that much more danger of subsequent infection with abscess formation.

Necrosis and breaking down of the ridge of bone has not occurred in any of our cases.

5. *Hemi-cranial anesthesia*: This form of neuroses occurred in every case, which was only to be expected, as the supra-orbital nerve had invariably been severed. The curious part was the difference in discomfort; in other words, the attitude of the different patients toward this condition. The complaints were limited entirely to the females, being described as a numb sensation, as though the part were dead. Sensation returned in every case, although the time of the establishment of the collateral nerve-function differed markedly. In the majority of instances, six months was sufficient, while in six cases certain areas of anesthesia are still present, and two of these belong to the earlier operations. There appears also to be some connection between the duration of the anesthesia and subsequent neuralgia. Thus in, I think, all of the cases in which

the hemi-cranial anesthesia was unduly prolonged, neuralgic manifestations always appeared subsequently.

6. *Neuralgia*: This is one of the most annoying sequelae that can follow operative intervention on the frontal sinus. Not only is the patient distressed, but the surgeon also, from the persistent importunities of the former to rid her of this continual pain. This is especially the case should neurasthenia be combined, as not infrequently appears in women, the sinus disease first causing the neurasthenia. Neuralgia or neuralgic manifestations were present in seven of our patients, but only in two were the symptoms sufficiently severe to demand surgical intervention. In one, despite resection of the nerve, the neuralgia recurred several weeks later.

It would appear as though several conditions may give rise to this neurosis. (1) The nerve endings becoming caught in and bound down by the scar. (3) Continuation of the original neuralgia which accompanied the sinus disease. (3) Neurasthenia. (4) Bulbar enlargement at end of nerve. It has been our observation, the more marked the deformity, the greater the neuralgic manifestations.

7. *Deformity*: The cosmetic result of the operation depends largely upon the size of the sinus, particularly the antero-posterior dimensions. Another very important factor is the method of healing which has taken place. If by first intention, the resulting scar is so slight that it becomes almost unnoticeable. If, for any reason, by granulation, the scar-tissue is very prominent, and by subsequent shrinking not only produces greater or lesser deformity, but also adds to the discomfort of the patient by embracing the terminal ends of the severed supra-orbital nerve. The scar is always more prominent from the inner end of the eyebrow downward along the side of the nose, while the depression is always found above the eyebrow toward the median line.

Our cases may be classified as follows: thirteen cases practically perfect, no scar or other defect recognizable unless special attention were called. Four cases, slight depression over operated eye, and some contraction of scar tissue along descending incision, this being due to subsequent reinfection. Result may be called very good.

In two cases the cosmetic result was not quite so good. In one the depression above the eye was marked, being due to an exceptionally high and deep sinus. This could have easily been corrected with paraffin, but the patient (a miner) was perfectly satisfied, and would not consider any further surgical treatment. In the other

case there was no deformity, but an edema persisted, which gave the forehead a swollen shiny appearance. She also had reinfection along line of incision. This case has already been referred to.

One case showed considerable deformity, both from the depression as well as scar-tissue contraction. During the operation the skin was torn from too great retraction. Healing took place by third intention, a fistula beneath the bridge of the bone persisting for several weeks. Reinfection occurred several months afterward.

Present condition: Some sinking in of forehead; scar-tissue prominent, drawing skin for several centimeters. The entire condition is much better after several injections of paraffin, so that deformity is not particularly noticeable.

From the retrospect of our cases it is unwise to give a prognosis of the deformity immediately after the operation, as the parts will not assume their permanent position until several months have elapsed.

8. *Formation of pneumatocele*: In two cases we noted a bulging over the anterior wall on blowing the nose, on the first dressing. After compression with tight bandage this disappeared. In none of the cases was this visible after the bandages were permanently removed.

9. *Temporary and permanent diplopia*: In fourteen of the cases double vision was present immediately after the first bandage was removed. This lasted a variable length of time, but in the majority of instances disappeared in a few days. Thus in eleven the diplopia had completely disappeared at the end of the first month. In one case it lasted for nearly four months, and in two cases it appeared permanent. These were Case 5 and Case 15, both young girls, in whom the sinuses were not especially large. In Case 5 the diplopia first appeared some two weeks after the operation and became more marked rather than diminishing as time elapsed. In the other case, double vision appeared on removal of the first dressing, and has persisted. The ocular disturbances in the first case can be explained when one takes into consideration its delayed appearance. During the process of healing the trochlea became involved in the new-forming scar-tissue, and became anchored, as it were, with resulting loss of function. The cause of the diplopia of the second case is not clear, but it would seem as though hysteria played a not inconsiderable role, as at first it was not only binocular but monocular as well. Repeated examinations failed to reveal the cause of this curious condition. After several weeks the monocular diplopia

disappeared, but the binocular persists even to the present time, (operation April 28, 1911).

In both of these cases the diplopia was counteracted by the wearing of appropriate lenses, and it would seem that the visual disturbance is also improved, although on removing the glasses the double vision (two years and one year after operation) is still marked.

10. *Blindness on operated side*: This unfortunate sequelae occurred in Case 16, curiously enough one of our later operations in which our technic was established. The disease involved the frontal, entire ethmoid and sphenoid on the right side, and complete exenteration of these parts was demanded. The operation progressed as usual, offering no especial difficulties, and it was not until the first dressing was removed and the patient tested for diplopia, that it was discovered that the eye was sightless. The eye ground was gone over immediately by an experienced ophthalmologist, who reported absolutely negative findings except pupil did not react to light. Despite every endeavor, the eye remained blind. In reviewing this case several possibilities may be advanced. First, in breaking away the lamina papyracea the bone may have been fractured into the optic foramen. Second, the optic nerve may have become surrounded by an extravasation of blood, which became organized. Third, a dehiscence may have existed in the sphenoid sinus and optic nerve sheath, injured while opening this sinus. The latter explanation seems the most plausible. It is interesting to note that this occurrence has been reported twice previously.*

Case 1: Agnes McA., 28 years old; operation, complete Killian, June 25, 1909, Polyclinic Hospital. Severe supra-orbital headache, impossible to concentrate thoughts or study. Purulent fetid discharge from right nostril, three years. 1. Six or seven weeks. 2. Several weeks ptosis. 3. Five or six weeks. 4. Stitch abscess one week after operation. 5. Eighteen months gradually disappeared. 6. Slight supra-orbital; several months. 7. (*a*) slight depression; (*c*) yes, but returned. 8. Four to five weeks after operation. 9. None. 10. None.

Case 2: Mary W., 50 years old; operation, Killian, November 18, 1910, Rush Hospital. Increasing frontal pain, great tenderness over frontal sinus; purulent fetid discharge from nose over two years. 1. Disappeared in few days. 2. None. 3. Several months;

*Knapp. Cecite consecutive a l'operation d'une emphyseme du sinus frontal. Annal d'oculi., p. 67, 1901. Freudenthal: Nouvele contribution a l'operation radicale de la sinusite frontale. Arch. Internat. de Laryng. Vol. 20, p. 761, 1905.

exacerbation with every fresh cold. 4. None. 5. Several months, somewhat annoying. 6. Slight neuralgia on exposure to cold or wet. 7. None; result perfect. 8. None. 9. Evanescent. 10. None.

Case 3: Grace P., 29 years old; operation, Killian, December 15, 1910, Rush Hospital. Chronic frontal sinusitis; pain and discharge; small sinus; about one year; complete cure. 1. Several days. 2. None. Several weeks. 4. None. 5. Slight, not complained of. 6. None. 7. None. 8. None. 9. None. 10. None.

Case 4: James B., 40 years old; operation, Killian, March 7, 1911, Rush Hospital. Chronic frontal sinusitis; discharge fetid; headaches violent; several years; cured. 1. About three weeks. 2. Slight; evanescent. 3. Gradually ceased after several months. 4. None. 5. Not complained of. 6. None. 7. Slight, due to sinking in. 8. None. 9. None. 10. None.

Case 5: Sadie McS., 21 years old; operation, complete Killian, April 28, 1911, Rush Hospital. Continual left supra-orbital headache; profuse purulent discharge from nose, also from post-nasal; gradually worse over a year; complete relief. 1. Lasted three months; now entirely gone. 2. No. 3. Two weeks; becomes affected with coryza. 4. No. 5. Almost one year. 6. Super-sensitiveness; now about the same. 7. (*a*) Slight flatness; (*b*) slightly visible; (*c*) none; (*d*) no; (*e*) no. 8. No. 9. Two weeks after operation; still in lower field; gradually getting better. 10. No.

Case 6: Mrs. J. H. C., 46 years old; operation, Killian, May 18, 1911, Rush Hospital. Severe headache and tenseness in right side of head and face; dizziness marked; copious discharge from right nostril; one year; instant relief. 1. Two or three weeks. 2. None. 3. Four or five months. 4. None. 5. Nine or ten months. 6. Over site of scar. 7. None; cosmetic result perfect. 8. None. 9. None (never appeared). 10. None.

Case 7: Ida L., operation, Killian, August 22, 1911, Rush Hospital. Continual colds, gradually becoming worse; supra-orbital pain, unilateral; nasal discharge; discharged cured. 1. Almost disappeared at time of discharge. 2. None. 3. No data available. 4. None. 5. No data available. 6. No data available. 7. No data available; none at time of discharge. 8. None. 9. Had disappeared. 10. None.

Case 8: Elizabeth McW., 26 years old; operation, Killian, September 8, 1911, Rush hospital. Intermittent supra-orbital headache; inability to work; pus from nose; impossible to use eyes for sewing, etc.; nearly two years; great relief. 1. Six or eight months; still slightly noticeable. 2. No. 3. Intermittent to present. 4. Abs-

cess, December 18, 1912; swelling and tenderness along line of supra-orbital incision; intra-nasal treatment; sudden discharge of large quantity of fetid pus (12/23); recovery. 5. None. 6. Anesthesia for several weeks. 7. (*a*) none; (*b*) none; (*c*) none; (*d*) none; (*e*) slightly visible. 8. No. 9. None 10. None.

Case 9: Frances K., 31 years old; operation, complete Killian, November 10, 1911, Medico-Chirurgical Hospital. Continual and excessive headaches and purulent fetid discharge from nose. Stenosis of lacrimal duct; lacrimatine; twelve years. Absolute relief until August, 1912; contracted grippal cold; nose began to discharge, not so profusely nor fetid. Some return of headaches, not so severe, but resembling; trifle neuralgia over scar; depression in forehead; reinfection of remains of ethmoid cells and sphenoid; operation ethmoid, January 21, 1913, and result good; paraffin injection January 28, 1913. 1. One month. 2. Three or four months before drooping disappeared. 3. Still slight; inclined to crust; some bother (due to ethmoid). 4. None. 5. Six to eight months. 6. Slight local; several months; never at any time very severe. 7 (*a*) Yes, quite noticeable; remedied by paraffin, January, 1913, which also cured anesthesia. 8. No. 9. No. 10. No.

Case 11: H. A., 20 years old; operation, complete Killian, February 6, 1912, Medico-Chirurgical Hospital. Sudden exophthalmos, with fever 104°. Great pain and protraction; no discharge. 1. Several months. 2. Difficult to determine, on account of edema. 3. Several months. 4. Eight months. 5. Not complained of. 6. None. 7. None, except in soft parts. 8. None. 9. None. 10. None.

Case 12: P. C., 40 years old; operation, complete Killian, March 23, 1912, Medico-Chirurgical Hospital. Severe pains over frontal for several years; gradually becoming worse; no tenderness over frontal; purulent discharge from nose since attack of grip over one year previous; operation, March 23, 1912; enormous sinus filled with pus and granulations; frontal wall partly necrotic; present condition, patient entirely well; considerable sinking in. 1. Disappeared in few days. 2. None. 3. No data available. 4. None. 5. No data available. 6. No data available. 7. Considerable flattening. 8. None. 9. None. 10. None.

Case 13: Jennie A., 31 years old; operation, Killian, May 15, 1912, Rush Hospital. Severe frontal headache, practically continuous, extended to temporal and occipital regions; profuse purulent discharge from nose; marked indigestion and sore throat; twelve years' tubercular history; absolute relief from headaches;

some slight discharge from nose remaining; November 23, 1912, reinfection swelling over scar, with pain, abscess. Present time, intermittent neuralgia like sudden sting of bee, gradually abating; worse in bad weather; still some discharge from nose; sore throat and indigestion disappeared; April 9, complains of drawing in scar tissue. 1. Intermittent; when present extends upward to forehead. 2. Very slight. 3. Still present, though not so profuse. 4. Has occurred three times along line of perpendicular incision. 5. Present. 6. Present. 7. Slight contraction of scar-tissue. 8. None. 9. None. 10. None.

Case 14: Mary R., 50 years old; Killian operation, anterior and posterior ethmoid and sphenoid, June 12, 1912, Medico-Chirurgical Hospital. Constant pain in supra-orbital region and parietal; feeling as though something was loose in head; some purulent discharge from nose; several years; during operation skin torn; fistula above and below bridge healed in two weeks, leaving depressed scar; five weeks after operation began to feel drawing sensation about one inch above scar; developed into true neuralgia; intermittent attacks; begins about 8 a. m., one hour, then about 4 p. m.; almost unbearable January 4, 1913, paraffin injected; cosmetic result good; neuralgia better. January 13, alcohol injections; no result. 1. Several months. 2. No droop. 3. Still present. 4. None after healing. 5. Several months followed by 6. Stinging sensations, sometimes darting. 7. Considerable sinking. 8. None. 9. Lasted seven months. 10. None.

Case 15: Bessie S., 22 years old; Killian complete, July 22, 1912, Medico-Chirurgical Hospital. Severe headache over left supra-orbital region; discharge from nose and into throat; dizziness on stooping; could not use eyes for work; kakosmia; sore throat; several months; great relief. 1. About nine weeks. 2. Partial several months. 3. Continues, thinner, no crusting, not so profuse; uses five handkerchiefs daily. 4. No. 5. Six months or so; still anesthesia immediately above scar-tissue. 6. No. 7. None; result excellent. 8. No. 9. Diplopia in all fields except to right.* 10. No.

Case 16: Jane A., 31 years old; Killian, December 11, 1912, Medico-Chirurgical Hospital. Severe supra-orbital pain and profuse discharge; for past ten years gradually growing worse; general system affected; patient anemic; sleeps badly, no appetite; loss of weight and strength, coughs, etc. Immediately after operation

*Since this report was read this patient was operated upon October 2, 1913, by Dr. Norman Risley who performed a tenotomy of the left superior rectus with resulting absolute fused binocular vision.

patient complains of blindness in right eye; absolute relief of headaches, and discharge thin and scanty; some new pain in eyeball and temple; sight never returned, and at present patient still blind on right side. 1. About six weeks. 2. Still slight droop. 3. Exacerbates on exposure to cold or wet. 4. None. 5. Marked. 6. Darting pains through eyeball and temple. 7. None. 8. None. 9. None. 10. Complete.

Case 17: Charles L., 62 years old; Killian operation, December 18, 1912, Medico-Chirurgical Hospital. Large mucocele of left frontal sinus; several years; complete cure. 1. Several months. 2. Very slight ptosis. 3. Two or three weeks. 4. None. 5. Not complained of. 6. None. 7. (*a*) Slight. 8. None. 9. Present before operation; not now. 10. None.

Case 18: Alice G., 32 years old; Killian complete, January 29, 1913, Medico-Chirurgical Hospital. Pain in frontal sinus and left eye; gradual exophthalmos; edema of eyelid; no discharge from nose; ethmoid cells polypoid and degenerated; sphenoid also; mucosa thickened; sight almost gone. 1. Still present. 2. Great ptosis. 3. No discharge. 4. None. 5. Not complained of. 6. None. 7. None. 8. None. 9. Eyesight almost gone; no better. 10. Was almost blind before operation.

Case 19: F. E. L., 41 years old, April 22, 1913. Patient in accident; injured in automobile; Medico-Chirurgical Hospital. Left frontal sinus crushed in with subsequent reinfection; necrosis of anterior wall with fistula formation; over one year. 1. Slight; soon disappeared. 2. None. 3. None. 4. Healed. 5. Not complained of. 6. None. 7. Marked depression. 8. None. 9. None. 10. None.

Case 20: Elberta L., 18 years old; operation, April 19, 1913, Medico-Chirurgical Hospital; healing by first intention. Continual and excessive headaches and purulent discharge from left side for one year; absolute relief from pain; discharge gradually ceasing May 17; anesthesia frontal and parietal; some tenderness in scar; no visible depression; slight edema of left eyelid; diplopia set in one week after operation; everywhere except to left; now very much better. 1. About ten weeks. 2. None. 3. Still present at end of twelve weeks, though greatly lessened. 4. None. 5. Present. 6. (*a*) Some tenderness in scar. 7. Vertical scar prominent; no depression. 8. None. 9. On certain positions of head diplopia. 10. None.

2032 Chestnut Street.

EMPYEMA OF THE FRONTAL SINUS WITH EXPOSED DURA CURED BY OBLITERATION OF THE SINUS.*

DR. THOMAS CHEW WORTHINGTON, BALTIMORE.

On September 19, 1911, the patient gave the following history: M. G., male, white, aged 35 years. He has had trouble with his nose as long as he can remember, viz: difficult nasal respiration, especially on the right side, with a great amount of mucus from the nose and from the naso-pharynx. From about July 1, 1911, he has had attacks of vertigo, especially when on the street. At times he would have to stop and hold his head. About July 15, 1911, he began to have severe pain over the right eye. Both eyelids as well as the surrounding tissue began to swell. On August 1, 1911, he was operated upon in a hospital, by having a piece of flesh taken from the right nostril. No improvement.

On August 8, 1911, he was again admitted to the same hospital, and under ether an operation was done over the right eye by a general surgeon. This reduced the swelling. He remained in the hospital for two weeks when he returned to his home wearing a bandage. In one week's time the upper lid began to swell once more. On September 7, 1911, he was again admitted to the same hospital, and the wound was reopened. He remained in the hospital one week and returned to his home still wearing the bandage. Yesterday, September 19, 1911, or just forty-two days from the first operation, he again began to suffer pain. This became aggravated last night. This morning he went to Dr. Harry Friedenwald's office because he could not open his right eye. The patient was referred to me by Dr. Friedenwald, as one of frontal sinus disease.

Conditions found September 19, 1911: The right upper eyelid is closed by inflammatory edema. This extends from the brow to the root of the nose. There is a fistulous opening near the inner canthus, which is discharging pus. Just at the middle of the eyebrow (or external to the supra-orbital foramen) is a small opening which connects with the frontal sinus. This opening is closed by a narrow piece of gauze three inches long. Upon its withdrawal, pus escapes freely from the sinus. The right nasal chamber is

*Read and patient presented before Section on Laryngology of the Baltimore Medical Society, January 24, 1913.

filled with large mucous polyps. There is no discharge of any sort to be seen anteriorly. The post-nasal fossa and the pharyngeal wall are covered with a thick purulent exudate. The patient complains of great pain about the eye and over the forehead. He has the appearance of serious illness.

September 20, 1911: Radical operation at the Baltimore Eye, Ear and Throat Hospital. Ether anesthesia. After removal of the nasal polyps it was found that the ethmoidal cells had already been largely destroyed by disease.

The sphenoidal cell and the maxillary sinus of the right side were opened, and drainage was established. Both of these sinuses were diseased. The frontal sinus was now opened into through the nose by the use of my angular frontal sinus curette. A discharge of thick pus from the frontal sinus followed the withdrawal of the instrument. The nasal cavity was wiped out as clean as possible and packed tightly with gauze saturated with twenty per cent argyrol solution. (The douche was not used.)

The external frontal sinus operation was begun by the usual incision carried along through the eyebrow and curving downward over the nasal bone. In this case the incision began where the previous incision had ended, which was at the extreme outer limit of the frontal sinus.

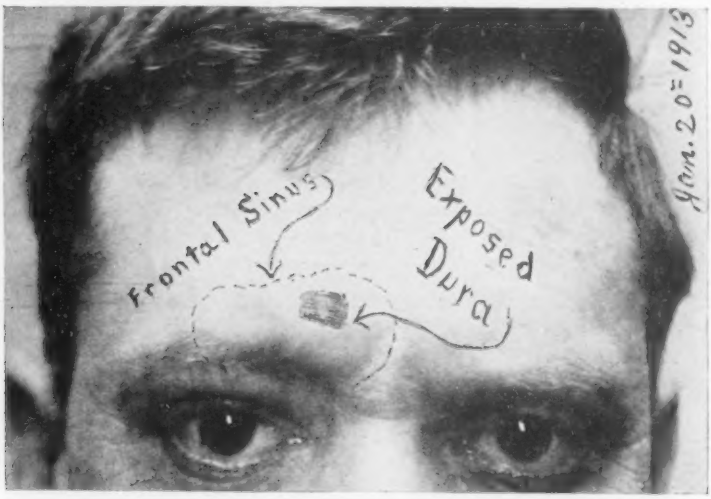
A sufficiently wide opening was made in the entire length of the frontal sinus for inspection and for treatment. This opening included the removal of a part of the nasal process of the superior maxillary bone and a few high ethmoidal cells.

The frontal sinus was filled with firm and tough granulations, evidently of long standing. The sinus had drained itself through the opening which I had just made intra-nasally, and it contained very little pus. It was found that the floor of the frontal sinus had broken down, that a part of the orbital plate and of the lacrimal bone had been destroyed, and that the sinus had been draining through the fistulous opening near the inner canthus.

The frontal sinus was cleared completely, leaving the bone clean and white and with a large passage into the nose. Near the upper margin of the posterior wall of the frontal sinus the dura was exposed. (See illustration.) The dura could be both seen and felt through an irregular necrotic opening in the sinus wall. The size of this opening was ¼ inch by ½ inch in length. The dura was covered with smaller and softer granulations than those which covered the sinus wall. The dural granulations were left untouched. The frontal sinus was now packed closely (not tightly) with 20 per

cent sol. argyrol gauze. An end of the gauze was passed into the nose. The edges of the periosteal covering of the lower part of the wound were approximated as nearly as possible, and the skin-wound was brought together by interrupted sutures. This left more than an inch opening for the treatment and obliteration of the frontal sinus. Fresh argyrol gauze was packed loosely into the nasal cavity. This completed the operation.

In twenty-four hours the nasal dressing was removed. The douche was now used very carefully in the lower part of the nose



Case of Mr. M. G. Obliteration of frontal sinus.

only. In five days the gauze was removed from the frontal sinus through the nose. The sinus was perfectly clean and was immediately repacked with argyrol gauze. The nasal cavity was at this time well douched with a weak permanganate solution. The frontal sinus was repacked every four or five days but was not irrigated during the entire treatment. The sphenoidal and maxillary sinuses were douched daily and were soon well. Plain sterile gauze was now substituted for the argyrol gauze in the frontal sinus. It soon became impossible to pass the gauze from the frontal sinus into the nose. By October 31, 1911, the frontal sinus was well covered with granulations. On January 2, 1912, the sinus was so small that it could hold but the smallest bit of gauze.

By January 23, 1912, the frontal sinus was obliterated and the wound had healed, making a period of exactly 125 days after the radical operation on September 20, 1911. At no time after the radical operation until the discharge of the patient was there any evidence of infection or of contamination of the frontal sinus. (The frontal sinus contained no exudate of any character during this period).

The obliteration of the frontal sinus is the result sought for in every operation done for disease of this cavity. Where possible, the frontal sinus should be closed at the time of operation, to save the patient from annoyance of long after-treatment and for cosmetic reasons as well. In this case the open treatment of the sinus was the only proper surgical procedure. It insured against "dead spaces" left within the cavity, and thereby against recurrences, and involvement of the dura mater. It is interesting to note that while there was no effort made for cosmetic effect, yet the deformity is not very noticeable. (See photograph taken January 20, 1913.)

I would call special attention to the fact that nasal irrigation was not used at the time of operation, because it is impossible under these conditions to know that the irrigating fluid will not enter the orbital cavity. This accident has occurred and will usually result in orbital cellulitis with impairment of vision, and may result in the loss of an eye. And for this reason the nasal cavity should not be douched directly after an ethmoidal operation.

It is difficult to determine the frequency with which necrosis of the posterior wall of the frontal sinus occurs. The same condition is found in the horizontal and cribriform plates of the ethmoidal bone as well as in the orbital plate, much oftener than is generally supposed. These complications are not in themselves serious when recognized in time. Unfortunately they are seldom reported.

Conclusion: This case illustrates very forcibly the necessity for the thorough and radical treatment of nasal accessory sinus disease. The repeated small external openings made in the diseased frontal sinus failed to effect a cure or even to relieve the symptoms of pus retention. It was only after the complete opening of the frontal sinus, together with the establishment of free drainage of the other diseased sinuses within the nose and careful after-treatment, that eradication of the frontal sinus was brought about, and with it entire relief of a disease of many years standing.

Although the dura mater must have been exposed for some time, and under the most unfavorable conditions, yet until the frontal sinus was opened this complication was not even suspected. Not-

withstanding its exposure by necrosis of the frontal bone the dura had remained healthy and there were no symptoms attributable to this condition.

On this date, January 24, 1913, a year after the end of treatment, I find the patient well, and with no evidence of disease of the nasal accessory sinuses.

1022 Madison Avenue.

Some Remote Effects of Chronic Sinus Suppuration. R. C. LYNCH, *New Orleans Med. and Surg. Jour.*, July, 1913.

A patient suffering from recurrent stiff neck, trapezius myalgia, inter-vertebral disk inflammation, mild arthritis of the shoulder joint, and then a rather severe attack of arthritis of the right knee was relieved by a radical operation for maxillary empyema. A woman, having evening temperature of 102° to 103° associated with slight cough (reflex) and progressive emaciation, was cured by correcting a chronic infection. A case of reflex asthma relieved by operation for chronic ethmoiditis. SCHEPPEGRELL.

Surgical Aspects of Goiter. URBAN MAES, *New Orleans Med. and Surg. Jour.*, July, 1913.

In the prophylactic control of hemorrhage, one vessel, preferably the superior thyroid or its anterior branch, must be spared to keep up the blood-supply of the gland. This same rule applies when we are using the ligature only in the treatment of hyperthyroidism. Better control is secured by ligating the inferior thyroid vessels if only one set is to be secured. The arteries are best ligated first, so as to allow the veins to empty themselves before the ligature is applied to them. Preserve the isthmus on account of the collateral blood-supply in case all the vessels of a lobe require ligature. Final hemostasis is secured by a fine cat-gut suture of the raw surface left after the cuneiform excision. SCHEPPEGRELL.

NERVE TRUNK ANESTHESIA AND CARBOLIZATION IN NASAL SURGERY.*

DR. GREENFIELD SLUDER, ST. LOUIS.

Nasal surgery presents two features that have surely engaged the attention of every nasal surgeon, i. e., anesthesia and reaction. It is relative to these considerations that I should like to narrate my experiences of the past three years, and call attention to what I believe to be an advantageous practice relating to both.

In all the more extensive surgical procedures in the nose the use of sufficient cocain raises the question of drug intoxication with its drawbacks. Three years ago I began the cocainization of the spheno-palatine ganglion (from which comes the entire sensory nerve-supply of the nose save the upper anterior part which is supplied by the internal nasal nerve), as a procedure for post-nasal surgical anesthesia. A short time later I began a similar practice with the internal nasal nerve, and a combination of these for all the severer bone surgery of the lateral wall. This practice has been exceedingly satisfactory in my hands—giving practically ideal anesthesia with a minimum of drug and so avoiding its poison-manifestations almost altogether. I know, however, that there are patients so susceptible to cocain and *all of its allied products*—local anesthetics sold by various names—that no local anesthetic so far known to me (quinine and urea has not been satisfactory in my experience), can be totally exempt from toxic properties. According to my understanding of Cushney's text[4] they are all chemical cousins as it were—cocain being the most potent but also the most toxic. And my experience has been that the rhinologist who has skillfully mastered the management of cocain as a surface anesthetic secures better results by its use than by the use of any other drug. It is along this line of argument that my present practice was developed. This consists in placing a very small applicator bearing one drop (½ minim) saturated solution cocain muriate (90 per cent) directly under the posterior tip of the middle turbinate and allowing it to remain fifteen minutes. I have cited this method of cocainizing the spheno-palatine ganglion several times.[1] It is faultless, according to my experience. Eight minutes after the setting of the applicator for the ganglion I set the applicator for the internal nasal

*Read before the Saint Louis Medical Society, Section on Oto-Laryngology, April 30, 1913.

nerve. For this purpose I use a smaller one which will carry only one-half drop; and I again use saturated solution cocain muriate. This is applied to the uppermost anterior aspect of the nasal fossa. The small applicator is introduced into nose in an upward direction. It very soon meets the anterior limit of the nasal fossa and then follows automatically to the angle of junction of the upper and anterior lines. It is at this point that the internal nasal nerve enters the nasal fossa. This nerve being more superficial requires less cocain and less time for anesthesia. Both applicators are removed simultaneously when one has been fifteen and the other seven minutes in position. The anesthesia thus produced in my experience gives more than a half hour's time for the performance of the most comprehensive bone surgery of the lateral wall. (My modification of the Mikulicz antrum operation among others.)[2] Anesthesia for all the surgery of the septum has always, in my experience, been very much easier, and satisfactory, in its performance, by simple painting with small amounts of cocain. For this reason I have never employed this method for the septum; but I see no reason why it should not be equally successful, applied, of course, in both nostrils.

I am fully aware that nerve-trunk anesthesia has been practiced by others over a period of several years. But as far as I am aware it has always been done by an attempt at submucous injection of cocain (or some other local anesthetic) into the nerve trunks, which is infinitely more troublesome and difficult than this surface application just described.

In addition to this and along the same line, I have resorted to nerve-trunk "blocking" using 5 per cent phenol in 95 per cent alcohol for this purpose injected by means of a straight needle used both for the internal nasal nerve and the spheno-palatine ganglion. For the former the attempt is made to locate the groove through which the internal nasal nerve enters the nose. For the latter it is introduced under the posterior tip of the middle turbinate in a direction backward, upward and slightly outward, and is introduced by measurement ⅔ cm. from its point of contact. I have shown this to be a trustworthy means of reaching the ganglion.[3] One-half ccm. of the solution is then injected. The result of these applications successfully made is a well-marked analgesia for which I want five to seven days. I prefer to wait until the reaction of the injection is over. There is anesthesia also but what I desire is the analgesia. In my experience this prevents to a very marked degree the shock of the larger operations at the time of their performance and the

"reaction" that may be very severe in "sensitive" patients. I have on two occasions done a high turbinectomy with a Hajek radical post-ethmoidal-sphenoidal operation and a general removal of the nasal wall of the ethmoid after such nerve blocking without the use of any additional anesthetic. But the use of a small drop of cocain (90 per cent) to the spheno-palatin ganglion and about ¼ drop to the anterior nasal nerve in addition to the "blocking" is so much more satisfactory, giving usually *absolute* anesthesia, that I feel that the former practice is not to be recommended except in very specialized cases. I say this because, according to my experience, *absolute* paralysis by "blocking" with phenol-alcohol in *these* parts is not the rule. It is usually a well-marked parasis; but not a total paralysis. The addition of the very small amount of cocain, however, then makes it complete.

In the performance of the Hajek radical post-ethmoidal-sphenoidal operation the large nerve-trunks are necessarily encountered to a greater or lesser extent as they enter through the spheno-palatine foramen. And the more so is this true, as the cut extends downward and outward and forward. It seems to me that this extension is necessary to give it "radical" qualities. In my experience, the shock of this operation increases directly in proportion as this extension is made.

Carbolic acid added to the alcohol prevents much, if not all of the pain of alcohol when injected; and the analgesia that follows seems to me much more and of longer duration, when carbolic acid has been added.

In the Hajek radical post-ethmoidal sphenoidal operation the large blood-vessels of the posterior supply of the nose are likewise of necessity encountered. For this reason it has seemed to me wise to pack after *this* operation whether the surgeon's prejudices be for or against packing in other nasal operations. And I feel that a pack in this district is worse than useless unless it be *really* tight and trustworthy. It is my practice to place accurately a double thickness of the Simpson -Berneys' sponge splint which has been perforated and tied together by a heavy silk ligature. (The ligature makes its withdrawal easy and sure.) Such a mass of compressed cotton when swelled by the wetting of blood and serum will measure 1½ ccm. or more in thickness. In my experience the tolerance of this plug is extremely trying for the patient who has not been "blocked." For him who has been satisfactorily "blocked" it may become sufficiently uncomfortable but will not sap his strength as much as it does in the man who has not been "blocked." (I should

estimate it about one-tenth as debilitating.) And to my mind this is equal in value, to the patient, to the escape from the primary shock. In fact, this "reaction" has often been much the worse of the two.

I am aware that a simple opening of the sphenoid may be done with little shock, or a post-ethmoidal cell may also be opened at the same time and still produce little shock.

BIBLIOGRAPHY.

1. Syndrome of spheno-palatine ganglion neurosis, *Am. Jour. Med. Sciences*, Dec. 1910.

2. THE LARYNGOSCOPE, Dec., 1909.

3. Transactions Am. Med. Assn., Sect. on Oto-laryngol., 1913.

4. Text-book of Pharmacology and Therapeutics by A. R. Cushney, Lea and Febiger, 1911, Philadelphia, page 316.

3542 Washington Avenue.

The Nose and Throat. E. DANZIGER, *N. Y. Med. Jour.*, April 19, 1913.

The author discusses the diagnosis and treatment of (1) abnormal development of structures; (2) acute and chronic inflammations of the mucous membranes due to metabolic conditions; and (3) neurosis (vaso-motor disturbances, anomalous sensations, or paresthesias). ED.

Cause of Perforation of the Nasal Septum. W. B. CHAMBERLIN, *O. State Med. Jour.*, April, 1913.

The author discusses the following causes of perforations and thus localizes them: Syphilis of the septum involves primarily the bone, occasionally the cartilage, but hardly ever the cartilage alone. Tuberculosis involves primarily the cartilage, the bone secondarily if the progress is unchecked. Perforating ulcer involves only the cartilage, never the bone. Traumatic perforation from operative interference may involve any portion of septum. ED.

INTRA-TRACHEAL ANESTHESIA FROM THE STANDPOINT OF THE NOSE, THROAT AND ORAL SURGEON WITH A DESCRIPTION OF A NEW INSTRUMENT FOR CATHETERIZING THE TRACHEA.*

DR. HENRY H. JANEWAY, NEW YORK CITY.

The satisfactory manner in which intra-tracheal anesthesia for operations in the nasal, oral or laryngeal regions or even within the trachea or bronchi meets the requirements demanded during such operations is deserving of special comment. The very multiplicity of methods of administering an anesthetic during nose and throat operations testifies to the presence of dissatisfaction with most of the methods in common use. This dissatisfaction is most apparent in the usual methods of anesthesia in which the anesthetic is inhaled from a cone. Under such conditions the surgeon can operate only during the intervals when the cone is removed. The anesthesia can never be a smooth one, but is characterized by periods of more or less profound coma alternating with periods of partial return to consciousness. During the latter, there is often more or less struggling and, perhaps, coughing or retching. Often the operation must be discontinued at very critical periods, at times for instance, when the hemorrhage may not be entirely controlled. Operating under such conditions greatly increases the dangers and risks, and unnecessarily prolongs the operation. The difficulty of preventing the inhalation of blood and mucus is great, and constant care and attention is necessary in order to prevent such a complication. When the patients are profoundly anesthetized asphyxia from the falling back of the tongue is frequently troublesome. Lane of London, who formerly used this method in connection with his cleft palate operations, has well remarked that anesthesia for oral operations demands the services of an expert anesthetist and one, preferably, who is accustomed to work with the operator.

A more useful method is intra-nasal or pharyngeal anesthesia. By this method the ether vapor may be conveyed to the patient through glass bulbs fitted into the anterior nares or by means of a catheter passing to the pharynx through the nose. Both these methods are much more satisfactory than the preceding. Their use permits of

*From the Department of Experimental Surgery of New York University and Bellevue Hospital Medical College.

a more even anesthesia and, especially when the catheter is used through the nose, of a much greater ease in preventing inhalation of mucous or blood. Neither method, however, is entirely satisfactory in this last respect. The blood and mucus within the mouth must be constantly sponged or sucked out, the head must be kept well thrown back and frequently trouble is experienced because of the falling back of the tongue.

Many surgeons have resorted to rectal anesthesia in order to avoid the inconvenience of the proximity of the anesthetist and his apparatus during operation about the head. Rectal anesthesia, however, has never come into general use. Perhaps this is an unfair argument to use against it. Its administration, nevertheless, requires considerable skill and accurate dosage by it is somewhat

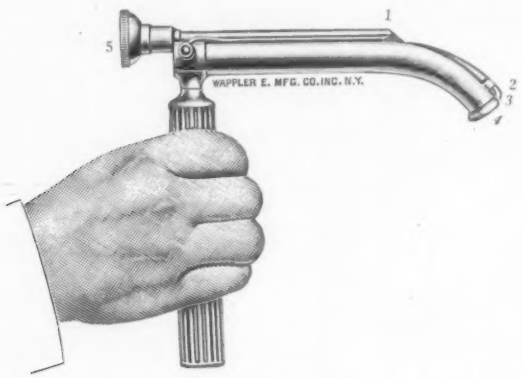


Figure 1. Indirect speculum for catheterizing the trachea. 1. Prism. 2. Lamp. 5. Objective glass through which the eye of the observer views the larynx in the direction of 3-4.

difficult. The rectum also must be carefully cleaned beforehand. Under usual conditions and with expert care irritation of the rectum is rarely produced. Cunningham, Leggett and Sutton have laid down the principles and developed the technic to a high point of efficiency.

Intra-venous anesthesia, only recently experimented with in this country, fulfills somewhat the same indications as rectal anesthesia.

To Dr. Francis Honan belongs much of the credit for developing in this country a successful technic for the administration of intravenous anesthesia.

With both rectal and intravenous anesthesia the surgeon must rely entirely upon the patient's position in order to protect the

trachea from the inhalation of blood and mucus and it is absolutely important to provide for free expiration in order to regularly eliminate the ether.

In contrast, however, to all these methods, anesthesia by intra-tracheal insufflation, i. e. through a tube introduced into the trachea, meets the requirements of the nose, throat and oral surgeon in an eminently satisfactory manner. Either ether or nitrous oxid and oxygen may be used as the anesthetic. With a minimum of effort on the part of the anesthetist, a perfectly even anesthesia is produced with complete relaxation of the patient and the maintenance of a rosy color. This statement is as true of nitrous oxid and oxygen, assuming that the patient is a normal individual, as it is of ether. In fact intra-tracheal anesthetization by both ether and

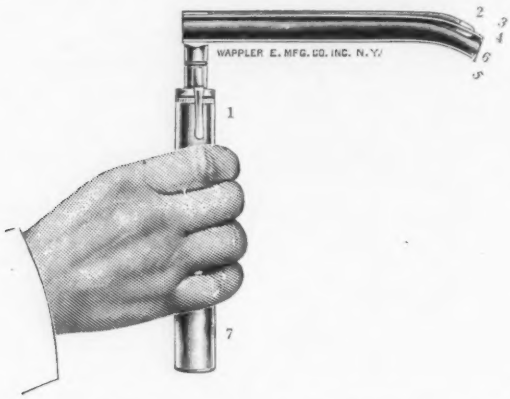


Figure 2. Direct speculum for catheterizing the trachea. 1. Press button for illuminating the lamp 2. Lamp. 3-4. Direction of vision. 5-6. Direction taken by the catheter. 7. Handle containing two dry cells.

nitrous oxid renders possible a better and more complete anesthesia that can be obtained by either of these anesthetics when administered in the ordinary manner. It is, therefore, questionable whether intra-tracheal anesthesia should not be ustd very generally.

The only drawback to intra-tracheal anesthesia is the difficulty sometimes experienced in inserting the intra-tracheal catheter. To the expert laryngologist it may seem that catheterization of the trachea should always be a simple matter. In the fully relaxed patient it is frequently an easy matter to pass a rubber catheter into the trachea with the fingers alone. In many patients, fully relaxed, the larynx can be seen and catheterized without even flex-

ing the head by the aid of the Jackson direct laryngoscope after the manner described by Dr. Richard Johnston of Baltimore.

The most reliable method of all is by means of the Jackson direct laryngoscope with the head in extreme extension. Even if simpler methods were as uniformly successful, the use of the direct laryngoscope in this manner would be preferable for the very important

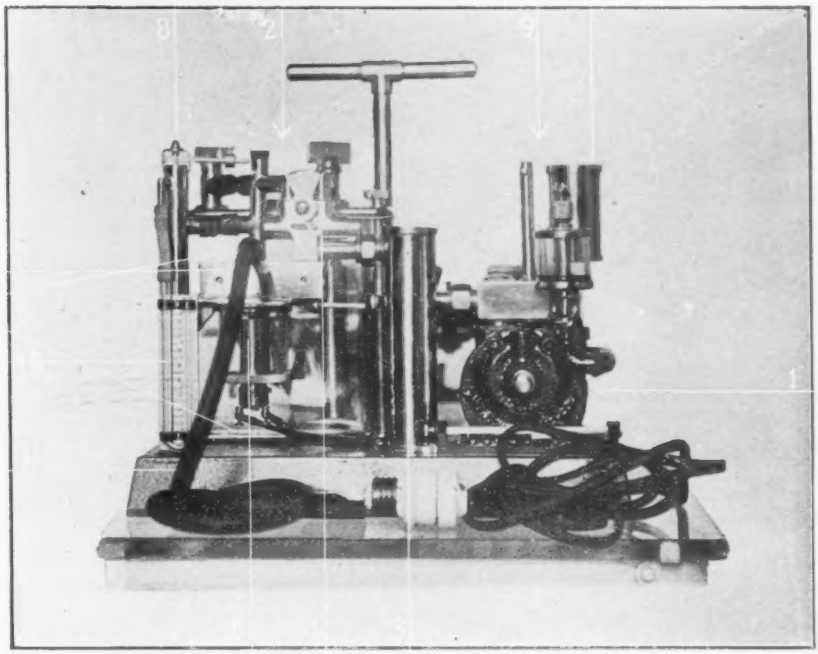


Figure 3. Apparatus for administering intra-tracheal ether anesthesia. It measures 12x14 inches and weighs 28 pounds. 1. Rotary blower; 2. Over the position of the motor which is hidden behind the ether jar. 3. Air filter and muffler into which the air passes from the blower. 4. Slide valve through which the air passes from the filter. It shunts any desired portion of the air from passing through the ether jar. 5. Ether jar. 6. Water jar, containing an electric heater for warming and moistening the current of air. 7. Interrupting slide valve operated by a worm wheel in the position indicated by the arrow "J," but hidden in the picture behind the blower "I." 8. Air pressure safety valve which can be set to blow off at any desired pressure. 10. Manometer. 11. Rubber tube conducting the air to the patient.

reason that it permits of inspection of the larynx before the insertion of the catheter. Dr. Chevalier Jackson has called the writer's attention to one death already attributable to intra-tracheal anesthesia because of failure to previously inspect the larynx.

Not a little trouble has been experienced, however, in the intro-

duction of the intra-tracheal catheter by this method. In fact, Dr. Connell of Roosevelt Hospital, whose experience has been very large, expressly states, (*Surgery, Gynecology and Obstetrics,* August, 1913, p. 50), that although intra-tracheal anesthesia is the best form of anesthesia and always superior to pharyngeal anesthesia, yet the difficulty of catheterizing the trachea will always prevent

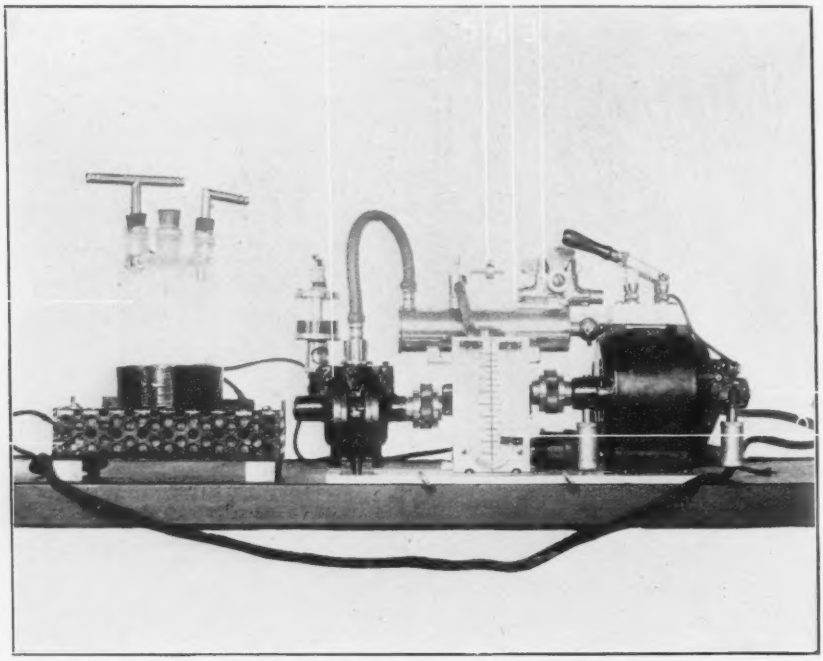


Figure 4. Apparatus for intra-tracheal anesthesia capable of being carried in small hand-bag. It measures 4½"x5"x15" and weighs 18 pounds. 1. Motor. 2. Blower. 3. Slide valve controlling the proportion of air passed over the ether. 4. Filter. 5. Safety valve. 6. Ether flask. 7. Rheostat. 8. Manometer.

the general adoption of the method. The writer's own experience confirms this view. He has seen another surgeon, who has administered as many as 500 intra-tracheal anesthesias, waste no little time in attempting to introduce a catheter into the trachea.

It will be unfortunate if a method of anesthesia so universally successful and valuable as intra-tracheal anesthesia fails to receive general adoption because of these difficulties. The main trouble in catherizing the trachea is the tendency for the catheter to fall

back into the esophagus. In using the direct laryngeal speculum the writer has frequently been impressed with the great advantage which would be offered by some means which would bend the distal end of the catheter forwards, if only a little forwards, so as it passes over the distal end of the direct laryngoscope. A wire stylet accomplishes this but is inconvenient to use.

In order to accomplish it in a simple manner, the writer has devised the speculum represented in Figure 1. It in part meets con-

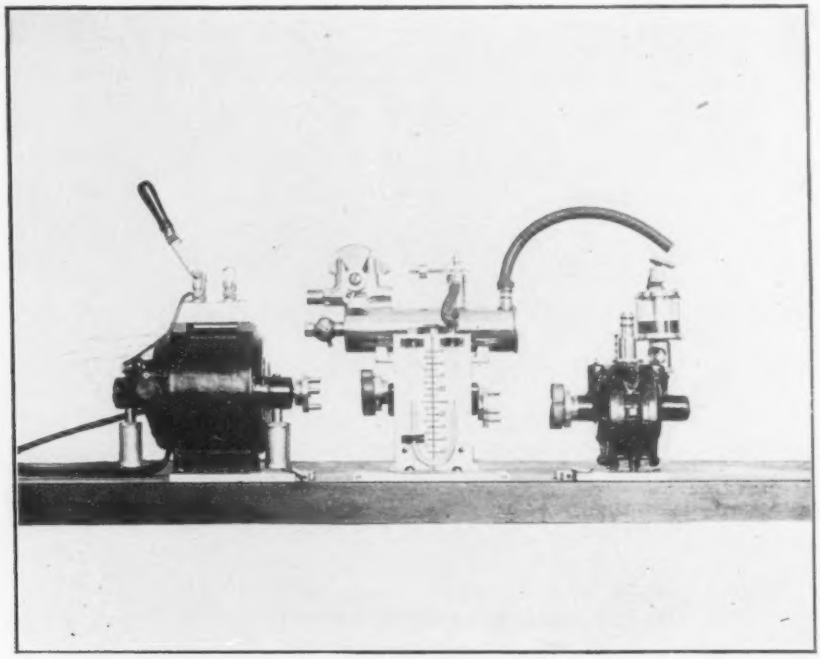


Figure 5 illustrates the manner in which the smaller apparatus may be taken apart into three pieces.

ditions demanded. At "1" is a prism which permits of visions in the direction 3-4 when the eye of the observer is placed at 5. With this instrument catheterization of the larynx after cocainization of the pharynx is an exceedingly simple matter in both the conscious and anesthetized patient and with but little extension of the head.

It has been discovered, however, that by shortening the distal end of this speculum the larynx may be viewed directly, that is, without the aid of the telescope, just beneath the distal termination of the

curved upper half of the speculum and through its central notch which serves to keep the catheter in the middle line, Figure "2."

This control of the distal end of the catheter even though it causes only a slight forward bend of the catheter offers a very great advantage. It permits of easy catheterization of the larynx even when the patient's pharyngeal reflexes are not completely abolished and without the necessity for the same degree of extension of the head. The omission of the telescope greatly simplifies the instrument, while the possibility of viewing the larynx directly is superior to viewing it indirectly, even though the latter method permits of a greater curve in the distal end of the catheter.

The illumination is obtained through a lamp placed at "2," which is lighted through two small storage cells contained in the handle of the instrument.

With this instrument, a large size of catheter ⅜ of an inch in diameter designed for intra-tracheal anesthesia by nitrous oxid and oxygen may easily be introduced into the larynx.

As soon as the tube has been introduced its external extremity is connected with the tube from the insufflation apparatus; and from this time on, that is before the beginning of the operation, the anesthetist may take his position at any convenient distance from the patient and the operator is unhindered by his presence or by an anesthetizing apparatus other than the tube emerging from between the patient's teeth. This tube, for mouth operations, is best held in place by an assistant who also manages the mouth-gag and retractors, for then it may be moved at will to any portion of the mouth not within the field of operation. For other operations, a small metal tube, one inch long, may be slipped over it between the teeth. This is kept from slipping out of the mouth by a spring which passes behind the neck somewhat in the same manner as a frame truss which maintains its position by pressure around the back. Figure 3 and 4 represents the author's apparatuses designed for supplying the ether vapor to the intra-tracheal tube. There are several features about them which deserve emphasis even at the expense of repetition. Figure 3 represents an apparatus which may be described as an easily portable machine, weighing about 28 pounds and measuring 10x12 inches and capable of supplying a continuous current of warm, moistened air saturated with any desired amount of ether vapor. The current may be interrupted automatically for the purpose of allowing regular deflation of the lungs.

These features are all of some importance and contribute to the best results in anesthesia. The temperature of the air delivered at

the end of a tube three feet long has been measured. It is 95 degrees, at least 15 to 30 degrees higher than a current of air coming directly from the ether bottle. It is also perceptibly moistened, and we are forced to believe that the every day experience of the evil effects of mouth-breathing makes it evident that warmed ether vapor mixed with moistened warm air approximate more closely to the normal physiological conditions and are better borne.

Next, concerning the amount of ether vapor. In the above apparatus it is possible to regulate the amount of ether in two ways, first by the slide valve "4" any portion of the current of air may be diverted from passing over the surface of the ether, second, by the cock handle "12" controlling the inlet valve to the ether flask, the percentage of ether vapor in the current of air may be increased over an amount which it is possible to pick up by simply passing the air over the surface of the ether by bubbling a portion of this air through the top layers of the ether. This additional quantity is sometimes needed with alcoholic patients.

Finally as regards the interruptions. By laboratory experiment there seems to be no change in the sphymographic tracings of the pulse produced by regularly interrupting the current of air supplied during intra-tracheal anesthesia when the anesthesia is administered within the limits of the proper pressures for intra-tracheal anesthesia. Very serious diminution of the volume output of the heart is produced by higher pressures. The greatest benefit obtained by interrupting the current of air is the effect of such interruptions when regularly and automatically performed upon respiration. The author possesses tracings which demonstrate the almost entire abolition of efforts at respiration caused by interrupting the current of air during intra-tracheal anesthesia. Such a condition renders the anesthesia far safer and does much, not only to conserve the expenditure of energy by the patient, but the ease of operating for the surgeon. In this apparatus only the physiological effect upon the patient is depended upon as the guide to the correct percentage of ether to use. Such is a safe guide, though Dr. Connell has rendered surgeons a service in defining the correct percentages and showing how closely definite percentages can be followed.

Figure 4 represents an apparatus which is still smaller and, therefore, more portable. It weighs only 18 lbs. and measures 4½x5x5 inches. By removing the two pins penetrating the base plate the apparatus will come apart in three pieces as illustrated in Figure 5 and may then be packed in a small hand-bag. This smaller ap-

paratus is most simple in construction. It contains the same size blower and motor as the apparatus figured in Figure 3 and only differs from the latter in not running quite so noiselessly and in not being provided with so serviceable a means for interrupting and warming and moistening the current of air.

Actual trial with this apparatus during a period of eight months has given uniformly good results. In the majority of cases in which the writer has used the apparatus there have been some special indications for it. Five have been intra-thoracic cases and, in most of the other cases, the operations were within the nose, mouth or about the head. It has given all the advantages which have been claimed for intra-tracheal insufflation. The operations were conducted without interference from the anesthetist or his apparatus and the anesthesia was smooth and uninterrupted. On no occasion was there any inconvenience from blood or mucus in the throat. During the past two years the writer has made a considerable number of esophagoscopic and gastroscopic examinations. These he usually conducts under local anesthesia, but for a complete gastroscopic examination it is desirable to give a general anesthetic. The ease of making these examinations with the smooth uninterrupted anesthesia produced by the intra-tracheal anesthesia contrasted strongly with similar examinations conducted under anesthesia produced by inhalation through the mouth.

Bronchoscopic examinations and operations may similarly be performed under intra-tracheal anesthesia—a small catheter may be inserted by the side of the bronchoscopic tube, or the insufflation apparatus may be connected directly to the bronchoscopic tube and the ether vapor administered intermittently.

In fact, it is interesting to note that a number of years ago Dr. Chevalier Jackson availed himself of true intra-tracheal insufflation and at the suggestion of T. Drysdale Buchanan added an auxilliary ether tube to his bronchoscope.

In conclusion, for the longer operations of the nose, throat and oral surgeon, intra-tracheal anesthesia meets the indications in a manner that no other form of anesthesia does.

The technic of nitrous oxid and oxygen by intra-tracheal insufflation differs considerably from ether anesthesia and will be described in another communication.

104 East Fortieth Street.

THE KUHN METHOD OF PERORAL NARCOSIS.*

DR. FRANKLIN HAZLEHURST, JR., BALTIMORE.

This very ingenious method has been developed by Franz Kuhn, of Cassel, Germany. Kuhn's first communication upon the subject[1] appeared in 1900 under the title "The Metal Tube in Intubation and as Tracheal Canula." The purpose of the instrument employed, as sketched in this brief article, was to bring the trachea in direct connection with the outer air; thus eliminating the mouth and nose as respiratory passages and making possible operations upon the nose and throat and their immediate neighborhood without fear of respiratory obstruction. The flexible metal tube was installed by means of an intubator by a procedure quite similar to the O'Dwyer method of intubation. The author claimed that the use of this tube would frequently obviate the necessity for tracheotomy. In a second paper in 1901 Kuhn[2] has this to say of the technic of introduction: "Though it may be necessary in intubating a child to seek the arytenoid cartilage, it is sufficient in adults to hold the posterior surface of the epiglottis with the left index-finger and let the tube glide into the larynx by making light turning and lateral movements. The tube is held fast in position with the left hand, while with the index-finger of the right hand the intubator is gradually disengaged. If the narcosis is not rather deep, introduction is naturally somewhat irritating."

The tube should be as large as possible, an essential point is the frequent cleansing of the tube of mucus and secretion by means of a "thin spiral brush." Use of the tube in indicated, (1) in cases where, on account of compression of the trachea as in struma or strumectomy, tracheotomy would likely be done, or as a substitute for tracheotomy, for the operative field is cleaner; (2) where aspiration of blood is feared, when gauze may be tamponed about the tube; (3) in routine narcosis to maintain patency of the air passage without pulling out the tongue or holding the jaw forward; (4) in inflammatory conditions where there is edema of the glottis; and (5) as a means of direct inflation after the introduction of the canula. In asphyxia this would be of prime importance.

In 1905 at the congress of South German Laryngologists at Heidelberg, Kuhn[3] emphasized the value of his method in bloody oper-

*Read at the meeting of the Laryngological Section of the Medical and Chirurgical Faculty of Maryland, Baltimore, March 28, 1913.

ations on the mouth, lips, jaws, tongue, throat or nose, its usefulness in cases of asphyxia due to anesthesia or other cause, and suggested the use of peroral narcosis to produce increased intra-pulmonary pressure as a substitute for the chambers of Sauer and Brauer in operations in the thoracic cavity. In the following year[4-6] he advocated peroral intubation in operations for cleft palate as well as for naso-pharyngeal tumors. Since the tube allows the mouth to be wide open, the throat near the tube may be tightly packed off; thus preventing aspiration of any material. In consequence of the uninterrupted anesthesia there is an essential shortening in the operation time. The tongue may be pressed back by a spatula, thus carried away from the teeth and the field of operation, and there is a cleaner field and a clearer view.

Kuhn[7] lays special stress on the use of his method of anesthesia in surgery on the base of the tongue, epiglottis, tonsils, and floor of the mouth. In surgery of these regions, especially in malignant disease, the method is of advantage because anesthesia is continuous, easier, and simpler than in methods ordinarily used. The hanging head may be dispensed with, aspiration is avoided, and the operator has a better view of his field. Kuhn has never seen ulcerations from the use of the tube; he considers that smaller amounts of anesthetic are necessary than would otherwise be employed.

In a monograph on the subject which is a summary of his experience to that date, Kuhn[8] states that he has demonstrated on animals the value of the method for "overpressure," that is for increasing the intra-pulmonary pressure in operations in the thoracic cavity. In treating the asphyxiated, air or oxygen can be introduced through a catheter passed into the trachea through the tube. Its chief domain is, however, anesthesia. It guarantees free inspiration without danger of aspiration, and continuous anesthesia; the narcotic is carried directly to the place of absorption; and it is possible by strong tamponade to suppress vomiting. Kuhn shows that the same observation holds in this method as in tracheotomized patients, that anesthesia is easily induced without release of disturbing pharyngeal reflexes, the reflex region of the trigeminus being excluded from irritation. The method is seen at its best in surgery of the air passages, where, with fear of aspiration removed, there is continual, peaceful anesthesia and the anesthetist is away from the field of operation.

Dirk[9] reported that he had used the method with success in a large number of head operations. O. Hildebrand[8] does many operations with this method of anesthesia, for example the radical oper-

ation upon the antrum of Highmore, which he had previously performed under local anesthesia owing to the inconveniences of the general method. Hildebrand, in about 100 cases, saw nothing worse than hoarseness and slight discomfort in swallowing as a result of the employment of the tube. Koehler[10] thinks favorably of the method and is of the opinion that Meltzer has added nothing essentially new to Kuhn's method.

My personal experience with the method has been limited to nine cases. I will state briefly the age, sex and operation for which the method was used where noted, the length of anesthesia through the tube, the quality of breathing before and after insertion of the tube, the amount of mucus contained in the throat, the presence of reflex phenomena as coughing, vomiting, etc.

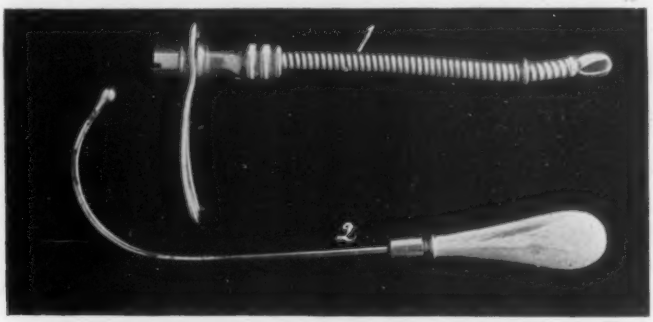


Figure 1. Laryngeal tube. Figure 2. Intubator.

Case 1: Girl, aged 13, disease atrophic rhinitis; operative exploration of left antrum of Highmore, curettage of the left ethmoid. Intubation easily accomplished; breathing, with tube inserted, very natural and easy; on account of the presence of mucus which seemed to be partially clogging the tube, Dr. Stewart of St. Agnes Hospital suggested routine use of morphin and atrophin preliminary to the general anesthesia. Operation time, one hour. Preliminary anesthesia before introduction of the tube, fifteen minutes. This patient was not rendered hoarse; there was slight soreness in the throat for a couple of days.

Case 2: Woman of 35 years. Carcinoma of the nasal fossa. Operation, entrance at inner angle of eye through the Gruenwald incision, removal of the middle turbinate and some tissue at the lower end of the ductus sinus frontalis. The case proved to be malignant involving the base of the brain with erosion of the cribiform

plate and the inner orbital plate. The operation was very bloody (malignant tissue) and of about one and one-half hours' duration. The use of the tube was very satisfactory, intubation was easily accomplished, breathing was easy, coughing and pharyngeal reflexes lacking. Patient showed no post-operative soreness of the throat.

Case 3: Man, aged 33; probably luetic necrosis of nasal septum, the hard palate, lateral wall of nose, and polypoid degeneration of the mucous membrane of the right antrum. Operation, radical antrum, with removal of dead bone. In this patient, intubation was readily accomplished but after a short time the tube slipped out.

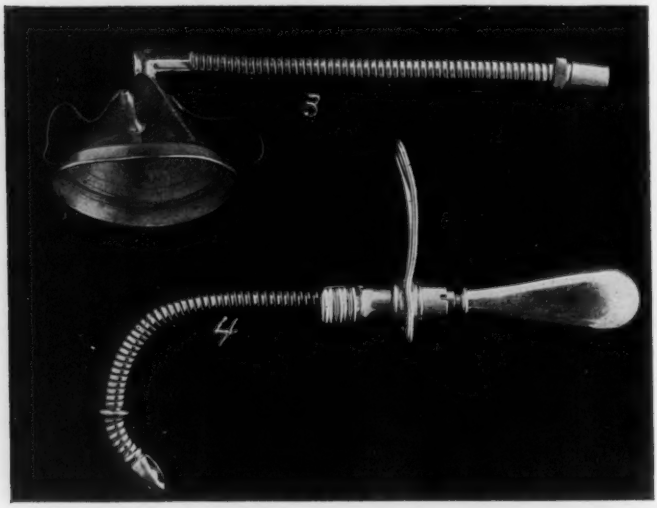


Figure 3. Distal attachment with cone through which anesthetic is administered and patient breathes.
Figure 4. Kuhn's laryngeal tube containing intubator.

The patient was a tall man, at least six feet and the tube was evidently too small to stick properly between his vocal cords. The tube was the middle sized tube. In this case the voice was not affected. The throat was sore but soreness was probably due to rather rough handling of the tongue during operation.

Case 4: Woman, aged 32; syphilitic adhesion of the soft palate to the posterior pharyngeal wall with perforation of the soft palate. Operation, closure of perforation, release of adhesions, insertion of silver plate to prevent re-adhesion. The quality of breathing before the insertion of the tube was rough, rapid, rate 40; after insertion of the tube, rate 26 and smoother. There was no cough-

ing or vomiting, etc. The tube was in place for two hours; the voice was unaffected, post-operatively; the throat was sore but this apparently from the raw pharyngeal areas and not from the larynx.

Case 5: This patient was a child, aged 10, on whom a mastoid operation was performed. The tube was inserted with the idea of allowing the anesthetist to be further from the operative field. In this case the tube appeared to be too large for the patient and because of incomplete insertion respiration was partially blocked. After a trial of about twenty minutes, during which the patient's cyanosis became rather marked, the tube was removed.

Case 6: A girl, aged 15, patient of Dr. Bloodgood's at St. Agnes Hospital in whom he proposed to explore for unerupted molar. Duration of intra-tracheal etherization, 20 minutes. The quality of the breathing was smooth, slightly rougher at times from mucous accumulations. Very satisfactory.

Case 7: Patient same as Case 1; atrophic rhinitis; operation left ethmoid through Gruenwald incision at inner corner of eye. Duration of anesthesia after insertion of the tube, one hour and twenty minutes; no untoward symptoms of any kind during or after operation.

Case 8: Same case; operation elevation of septal mucous membrane and deposition of paraffin in order to narrow left nasal fossa. Duration of anesthesia per tubam was about forty-five minutes; breathing was remarkably free and patient had no marked soreness of the throat and no hoarseness after operation.

Case 9: Woman, aged 42; chronic antral and ethmoid suppuration with polyp formation. Operation, radical antrum according to method of Caldwell-Luc, and exenteration of the ethmoid cells, with exploration of the sphenoid sinus. In this case, operated upon by Dr. Goldbach and myself, intubation was rather difficult but after several trials was finally successful. Mucous collection, which was abundant in throat before introduction of tube, was practically absent during anesthesia per tubam, which lasted one hour and fifteen minutes.

My experience with this method, while limited, has impressed me with its great practicability in operations of any kind about the head. The facts stated by Kuhn in regard to the more accessible operative field, the absence of danger of aspiration of foreign material, the practical absence of the large mucous accumulations so common in ordinary methods of ether anesthesia, and the continuous peaceful anesthesia with absence of the usual pharyngeal reflex phenomena are well borne out by my experience.

BIBLIOGRAPHY.

1. KUHN: *Wiener klin. Rundschau*, No. 28, 1900.
2. KUHN: *Centralblatt f. Chirurgie*, 52, 1901.
3. KUHN: *Centralblatt f. Laryngologie*, p. 457, 1905.
4. KUHN: *Centralblatt f. Chirurgie*, No. 10, 1906.
5. KUHN: *Muench, med. Wochenschr.*, No. 14, 1906.
6. KUHN: *Deutsche Zeitschr. f. Chirurgie*, Bd. 78, 1906.
7. KUHN: *Centralblatt f. Laryngologie*, p. 56, 1908.
8. KUHN: Die perorale Intubation. Ein Leitfaden zur Erlernung und Ausfuehrung der Methode mit reicher Casuistik, Berlin, 1911. Verlag Karger.
9. DIRK: *Deutsche med. Wochenschr.*, No. 40, 1906.
10. KOEHLER: *Muench. med. Wochenschr.*, No. 45, 1910.

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Stuttering and Its Treatment. F. A. BRYANT, *Med. Rec.*, Oct. 4, 1913.

In a very interesting and instructive paper on this important subject the author describes the various factors in an analytical manner.

Most cases depend, probably, upon an exaggerated irritability of the natural reflexes associated with the spontaneous production of speech. Phylogenetic influences play an important part in causing stuttering. Imitation and fear are also common factors in the production of this ailment. Sudden fright in childhood is an active cause. Attention is directed to the morphological changes that the brain-cells undergo in shock produced by fear, according to the investigations of Crile.

Other diseased conditions of the body are brought about as a result of the habit of stuttering, neurasthenia, hypochondria and melancholia. Improper breathing fails to aerate the lungs and pulmonary changes may occur. The prognosis is variable, depending upon the causative factor.

Didactic and pedagogic treatment shows the best results. This consists in going over the technic of speech from its very simplest forms to that of the complicated utterances. The respiratory channels must be placed in good condition. LEDERMAN.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, April 23, 1913.

WILLIAM W. CARTER, CHAIRMAN.

(*Continued from page 1038*)

Safety Pin Removed From Larynx of Child by Direct Laryngoscopy.
DR. HARMON SMITH.

Mary McD., aged 12½ years, was first seen by Dr. S. T. Quinn, of Elizabeth, N. J., on February 22, 1913, at which time she was hoarse and had a croupy cough. Temperature was 99° and pulse 90. Examination of throat negative; of chest revealed some bronchial rales. Diagnosis of bronchial croup was made and a laxative with syr. of ipecac was administered. The condition improved under the treatment. February 27, five days later, the child became suddenly worse and Dr. Quinn was again called and found the child in bed with marked dyspnea and dry croupy cough. Temperature, 99°; examination of pharynx negative. Dr. J. S. Green was called in consultation and a diagnosis of membranous laryngitis was made. An O'Dwyer intubation tube was inserted into the larynx which immediately relieved the obstructive respiratory symptoms. Three thousand units of diphtheria anti-toxin was also injected. A culture from the pharynx was negative. The tube was retained forty-eight hours when it was coughed up. The condition of the child improved in every way, except the hoarseness which persisted. On March 18, twenty-four days after the first attack the child again became croupy and in the absence of Dr. Quinn, Dr. Green administered syr. of ipecac with favorable results. As the hoarseness persisted Dr. Quinn called Dr. Norton Wilson in consultation to examine the larynx on March 30, thirty-six days after the first attack, and with the laryngoscopic mirror Dr. Wilson thought he observed a growth in the larynx which he took to be a papilloma, and advised that the child be submitted to me for the removal of the growth and for advice concerning the subsequent care of the case.

On March 31, (thirty-seven days after the first attack simulating croup), I saw the child which was then dyspneic, breathing rapidly, with marked episternal retraction and in bad physical condition. I prepared to do a tracheotomy immediately after examining the larynx and await the physical recuperation of the child before removing any of the growths unless it was found to be single and pedunculated. Under chloroform anesthesia I passed the Jackson laryngoscopic spatula into the larynx and encountered considerable mucus which was sponged away, during which procedure I observed a bright metallic point projecting

above the cords in the anterior commissure and with grasping forceps easily removed a closed safety pin, the extremity protecting the point of the pin being uppermost.

The child's breathing immediately became easier and the next day it returned home where it has made an uneventful recovery. The doctor assures me by letter that her voice is now normal, although it remained hoarse for quite a while. The interest of the case lies in the fact that treatment for membranous croup lessened the symptoms, that the introduction of an intubation tube did not disturb the position of the pin, and while the child was able to cough out the tube it still held the pin firmly fixed between the cords, and lastly that in cases where no membrane is in evidence and the microscopic examination of cultures is negative, and the disturbance of respiration and voice continues, it is unquestionably advisable to have the larynx and bronchi examined by the direct method if for no other reason than to exclude the presence of a foreign body as the cause of the disturbance.

DISCUSSION.

DR. EMIL MAYER said that he would like to make one addition to the conclusions drawn by Dr. Smith, namely, to have an x-ray picture taken. In March a child had been brought to him from New Jersey with a history of difficulty in swallowing which had come on shortly after an attack of retro-pharyngeal abscess in December. No history was given of anything that could in any way account for the child's condition, which was really very pitiable. With the aid of a pharyngoscope he was able to get a good view of the larynx. The edema, however, was so great, covering the whole of the upper portion of the larynx, that it was evident something urgent must be done. The child was accordingly sent to the hospital, and there, as a part of the routine examination, an x-ray picture was made, which showed a foreign body in the larynx. The following day there was no difficulty in introducing an esophageal tube, and the foreign body was removed, which proved to be a lead seal with a wire attached. Even at that time, when the father was asked if any piece of jewelry was missing, he replied in the negative. The child recovered very well from the esophagoscopy, but expired in the middle of the night. It had been in a very weakened condition for some time before it was admitted. It seemed probable that its life could have been saved had it been seen earlier. After its death, the father recalled that on January 7, the child had swallowed something and was taken to a doctor, who told them that they were making a fuss about nothing. The father had asked the doctor then to have an x-ray picture taken, but he refused. Strange to say, this whole episode was entirely forgotten. If the father had given this history when the child was brought in it is possible that even then the child might have been saved.

Dr. Smith was certainly to be congratulated on the results in the case reported, and his conclusions should be borne in mind.

DR. WILSON said that the case was a most interesting one. When he was called to see the child the day before Dr. Smith saw it, he examined it with a laryngeal mirror and thought that he discovered a slight growth of some material which looked like a papillomatous mass. He

had suggested that it was the proper thing to have a direct examination made to determine its true character and referred it to Dr. Smith.

Dr. Lynah congratulated Dr. Smith on the very interesting case he presented, and also wished to congratulate the physician who was able to intubate a larynx with a foreign body without dislodging it. He thought this broke all records. He himself had intubated a child with an enlarged thymus gland which had been mistaken for croup. So far as cultures in these cases are concerned, they are frequently negative, for staphylococci outgrow the diphtheria bacilli on the surface of the membrane and unless you get under the membrane you will get a negative result. Therefore under the conditions correct judgment was used in treating the case as laryngeal diphtheria. From fifty to sixty per cent of the cases of laryngeal and bronchial diphtheritic stenoses show no local manifestations in the pharynx and such a case as Dr. Smith has reported should put us on our guard when dealing with types of acute laryngeal stenosis.

Dr. Harmon Smith said that he could very well understand how this object was mistaken for a papilloma, as it was covered with mucus, the child was breathing rapidly and a view of the larynx was obtained with great difficulty. To illustrate how near the child had come to having a tracheotomy performed unnecessarily, Dr. Smith said that when called upon by Dr. Quinn relative to what had best be done in the case of papilloma of the larynx, he had suggested that tracheotomy be performed and advised that Dr. Wilson perform the operation there instead of sending him to New York for it. He said, however, that if he wished him to make an examination for the determination of the character of the growth that he could send him in to the hospital where the examination could be made, and then returned to Dr. Wilson for the tracheotomy. The discovery of the foreign body was really accidental as preparations had been made for the diagnosis and possible removal of the papilloma. The pin was located in the anterior commissure and held there apparently by muscular contraction rather than by adhesion, as it was extracted with difficulty and without bleeding. The main interest of the case lay in the intubation with the safety pin in the larynx and the difficulty of obtaining a correct diagnosis under problematical circumstances without the employment of the x-ray or the use of the direct method of examination.

Case of Congenital Deformity of the Nose. Presented by Dr. Carter for Dr. Myles.

The patient was a child, 6 months of age, with a congenital deformity of the nose. It was brought in to Dr. Myles' clinic to-day, and the mother was asked to bring the child before the Section. Dr. Myles would like to have any suggestions as to the character of the deformity, the best way to correct it, and when it should be attempted. It was a very interesting and rare condition. The child is perfectly healthy and the parents are young, strong and have no history of specific disease. At the third month of pregnancy the mother struck her abdomen against the sharp corner of a bed.

DISCUSSION.

DR. EMIL MAYER said that it was difficult to speak positively from a superficial examination of so interesting and unusual a case. It would seem worth while, however, to consider elevation of the nose from within; perhaps Carter's ingenious bridge splint might raise up the depressed condition. It might be well to try that first, and then later on see what could be done to the interior of the nares.

DR. CARTER said that it was an extremely rare type of nasal deformity, and was due, as could readily be seen, to an imperfect union of the two sides of the nose. Other portions of the child's head also showed a tendency to the embryonal type; the eyes were far apart, the nasal bridge was very wide, and there was a tendency for the eyes to remain on the side of the head, as in the embryo. It is a true embryological nasal deformity. Such cases were very rare indeed. It had been his good fortune to see one other, the only one he knew of in New York. The patient was a girl, 18 years of age, first seen in 1910. He did not recall whether or not he had presented the case before the Section. There was a double septum, the two planes being developed side by side, with an interval between. At the tip of the nose there was a wide separation of the two nostrils. The cartilages forming the nasal orifices being separated by a deep furrow, each cartilage forming a naris by itself. In correcting a deformity of this kind something else must be done besides a readjustment of the nasal tissues. They are all out of place. As Dr. Mayer had suggested, the bridge splint operation, accompanied by a plastic operation would seem to be indicated. A wide, wedge-shaped piece would have to be taken from the center of the nose, and under the alae it would have to be raised up. A semilunar flap would have to be made, and the two parts brought up and everted to make a tube. The nasal processes of the superior maxillae would also have to be approximated by suitable apparatus.

This is what is called the "dog-nose deformity." In a young child like this, it would seem that something could be accomplished by doing a plastic operation, and using the bridge splint, and then moulding it into shape by means of lead plates, padding them and changing them from time to time, so as to bring the nasal process of the superior maxillae closer together. It was also a question as to whether or not some apparatus might not be devised to bring the whole head into better adjustment, for there was a possibility that this child might become blind. The girl upon whom he had operated was blind in one eye, supposed to be due to the fact that the images had been suppressed for so long in the eye. Beginning at the age of this child, one ought to be able to get good results, for if the parts could be brought into good position and develop in good position a good result might be secured.

Dr. Carter showed a cast of the case upon which he had operated—a typical case of dog-nose deformity, showing the way such cases develop at about the age of his patient. The eyes were away over on the side of the head, so far separated that the concentration of the visual angle was impossible, and the girl became blind in one eye.

In correcting a nose of that kind after it has reached the adult stage, it was not advisable to narrow the bridge of the nose too much, for in correcting the nasal deformity the symmetry of the face must be considered, the relationship of the distance between the eyes, the size of the nose, and the size of the face, etc. To narrow the nose too much would create a greater asymmetry than already existed. The casts of Dr. Carter's case showed perfect correction of the deformity.

In operating upon the girl referred to, Dr. Carter said that a wedge-shaped piece was removed. After taking out this wedge the edges of the wound were everted and brought together. The bridge splint was kept in place for two weeks. The operation corrected the greater part of the deformity, but the eyes were still very much to the side of the head. Posterior rhinoscopy showed the choanae to be much broader than usual; the septum, also, was very broad, and was double.

DR. WILSON asked if he was correct in understanding that this child was blind in one eye.

DR. CARTER replied that he did not know whether that condition prevailed in this instance, but in the case he had operated upon the patient was blind in one eye. It was said that the image was suppressed in that eye for so long that she could not see. Her eyes were very carefully examined, there was no optic atrophy, and they were said to be all right. Possibly there was some malformation of the retina that prevented her from seeing, but she was certainly blind in one eye.

Intra-Nasal Operations and Their Relation to Hearing. DR. SAMUEL W. THURBER.

(*To be published in full in a subsequent issue of* THE LARYNGOSCOPE.)

DISCUSSION.

DR. MCCOY said that the paper was most timely and particularly adapted for the Nose and Throat Section. Those who treat the ears, as most of the members do, see many dire conditions. Many patients suffer disastrously from deafness and tinnitus, which is all the more distressing when we consider that many, if not all of them, could have been prevented by proper attention to the nose and naso-pharynx at the proper time. The paper presented many good points for discussion. In considering the etiology of the so-called dry catarrhs—the catarrhal adhesive conditions in the middle ear—we find that almost always the cause is located in the nose or naso-pharynx. Many of these cases start in childhood, and it would seem that the regular examination of the nose and naso-pharynx during childhood would, in a large measure, conserve the hearing of children, and adults as well as the specialists who are seeing children all the time, cannot have this fact impressed upon them too strongly. Not long since, in a paper before the Children's Section, some of the members of which rather pooh-poohed the idea of children having sinusitis, it required a good deal of argument to persuade some of the pediatrists that one might frequently see accessory sinusitis in a child.

Dr. Thurber had spoken of the amount of accessory sinusitis seen in children. It was granted to be the cause of many cases of atrophic rhinitis. We have had many cases of accessory sinus disease. Dr. Mc-

Coy said that in his practice, during the last few years, he has had occasion to operate radically on children from 1 to 6 years of age for ethmoidal labyrinthine conditions which had suppurated and perforated the orbital plates and extended into the eye. If that had been his experience in six years with such virulent infections as to have broken through into the eye, it is easy to see that there must be many cases which should be treated, but fail to receive attention because the conditions are not extreme. Many children unquestionably suffer from accessory sinus conditions. The conditions in the pharynx are generally classified under the term of adenoids, and the conditions in the nose as hypertrophic rhinitis and deviated septum. In hypertrophic rhinitis Dr. Thurber mentions deafness as being caused by deficient drainage and deviated septum also.

It is a nice question as to how young we should operate and how much of the septum should be removed. Dr. Thurber's dictum to conserve as much of the septum as possible was wise; yet, if it should be so deviated as to cause serious trouble, possibly accessory sinus or ear trouble, it should be removed so as to give good ventilation and drainage to the nose.

Another question which had been brought up was that of operating for the removal of adenoids in an acute stage of inflammation in which the ear is involved. There is no question but that all agree it is better to wait until the acute stage has subsided. As Dr. Thurber has said, if we wish to preserve or help the hearing, we must preserve the function of secretion and attend to the proper ventilation and drainage of the air passages.

In the latter part of the paper, reference was made to the question of whether it is wise to remove the minor deformities of the nose. It would seem that it is wise to remove them, for a slight deformity in one nose may create a great amount of disturbance, and a large amount of deformity may create a small amount of disturbance; therefore, since we cannot measure the amount of disturbance that is being created, we should do everything we can to remove the obstruction and place the nose in as normal a condition as possible in order to conserve the hearing of the future generation. This applies particularly to the examination of children.

Dr. Seymour Oppenheimer said that the paper brought up many important points for consideration. The prognosis of hearing, so far as influenced by intra-nasal treatment and surgery, depends very much on the prognosis of the intra-nasal condition. Given a case of intra-nasal disease which is amenable to treatment, the otitis is more amenable to treatment provided the functional conditions show not too great a deviation from the normal, i. e. not too great an adhesive process and there is no internal ear involvement, for in this latter condition all intra-nasal treatment and surgery is of no avail.

As to operative and pathological conditions, one in particular which is frequently overlooked and which is largely responsible for the existence of otitic symptoms, is the presence of posterior hypertrophies of

the turbinate bodies. It has only been since more of the men have been working with the pharyngoscope and inspecting the pharynx better that we are able to recognize more accurately conditions in the naso-pharynx. It is astonishing to find how frequently posterior hypertrophy of the inferior turbinate exists, and how frequently we can with this instrument recognize conditions of the mouth of the Eustachian tube which could not be recognized with the post-nasal mirror; and how frequently we find secretions coming from the choanae which affect the mouth of the Eustachian tube and give rise to otitic symptoms. The results in cases of deafness have been very much better since we have been paying more attention to the condition of the mouth and lumen of the Eustachian tube. I take it for granted in these cases that there is something in the nasal passageway which has been the cause of these tubal inflammatory processes.

As to the removal of adenoids, it is surprising how often this is badly done in so far as it affects ear symptoms. A prominent otologist who does not do any throat operations, recently stated that he had been sending his adenoid cases with otitic symptoms to the laryngologist, but that most of the men that had operated for him failed to correct the conditions; for while they removed a large mass from the pharynx, they generally overlooked the very region which had caused the otitic symptoms, namely, the lymphoid mass in the fossa of Rosenmueller. More care should be exercised in the removal of masses of lymphoid tissue in the naso-pharynx, and some type of operation should be adopted which will permit the removal of lymphoid tissue under direct inspection, rather than working in the dark with the curette.

The time of operation is most important. Many times, sufficient judgment is not exercised in urging operations in the nose and throat in the presence of acute or sub-acute otitic symptoms. Dr. Oppenheimer said that he knew of many unpleasant occurrences which had developed as the result of injudicious and ill-timed operations, not sufficient time having been allowed to elapse to permit the naso-pharynx to free itself of infection.

Dr. Page expressed his regret that he had not arrived in time to hear all of the paper. He thought that what Dr. McCoy had said about obtaining proper ventilation of the naso-pharynx without *subsequent atrophic changes* occurring, was what was most to be desired. Several years ago the tendency of the operators was to attempt the removal of every vestige of adenoid tissue in the naso-pharynx. Their enthusiasm often resulted in the destruction of the whole mucous membrane, and in such traumatism around the tubes that double otitis media was not infrequent. This practice is still not uncommon. He considers it better practice, particularly in babies and young children, to remove the adenoids only with a La Force adenotome, without trying to scrape it all out at one time with a curette. When recurrence occurs it can be removed again in the same way, with the gentle use of a small curette in Rosenmueller's fossa where this is particularly indicated.

He agreed with what Dr. Oppenheimer had said about the use of the naso-pharyngoscope and had himself found this instrument of great value,

as with it he had been able to inspect conditions in the naso-pharynx which could not be seen with the mirror and to treat conditions which he could not treat before. He had also found Dr. Yankauer's Eustachian applicator very useful in these conditions.

DR. PHILLIPS said that Dr. Thurber's able and interesting paper had evidently been prepared for the purpose of provoking a discussion, and there was little doubt that it would accomplish that purpose. A number of points suggested themselves to him, but he would confine his remarks to two or three. In the first place the primary cause of acute purulent otitis media is in the nose. Recurring attacks of acute purulent otitis media invariably occur in children who have adenoids and tonsils, and if you take these out you will have no more trouble. The cause of infectious purulent otitis media is the introduction of infectious material through the Eustachian tube, and of course it comes from the nose and naso-pharynx. There are rare exceptions to this. Just so far as attacks of acute infectious rhinitis are prevented, the frequency of acute purulent otitis media will be lessened.

In regard to acute and chronic catarrhal otitis media: Acute catarrhal otitis media is a distinct affection and should not in any way be connected or associated with acute purulent otitis media. They are not alike in any respect. Acute purulent otitis media is bacteriological and inflammatory in its origin. Acute catarrhal otitis media is never infectious and it never becomes purulent of itself. Whenever the purulent state supervenes, it is a new disease due to a new cause. What is the cause of an acute catarrhal otitis media? It is due to temporary closure of the Eustachian tube. Following said closure some reduction of the enclosed air takes place and a partial vacuum ensues. "Nature abhors a vacuum," and hence the drum retracts. You have a retracted drum in acute catarrhal otitis media and you have a bulging drum in acute purulent otitis media. The next thing to occur after the drum is retracted is the pouring out of serum from the small blood vessels into the tympanic cavity. Now, the untreated cases of acute catarrhal otitis media, wherein the serum is allowed to remain and no effort is made to release the pressure in the intra-tympanic cavity, gradually become chronic in type. The treatment for acute catarrhal otitis media is inflation. Dr. Phillips expressed the opinion that we fail to realize how frequent are these attacks in children, and how many children of ten, eleven, twelve or thirteen years of age show degenerative changes in the drum—retraction, etc., and that failure to treat acute cases in childhood is the cause of chronic catarrhal deafness.

It is not so much the importance of telling the fathers and mothers that they must have the noses of the children kept in perfect condition. Even the removal of tonsils and adenoids does not wholly prevent children from catching cold and having attacks of catarrhal otitis media. Parents should be instructed that when their children have colds in the head with indications of acute catarrhal otitis media,—slight pain, deafness, stuffy sensations,—to consult an otologist for prompt treatment. In this way, the development of catarrhal otitis media will often be prevented.

DR. KOPETSKY stated that he wished to add one point to what Dr. Phillips had said. In adult cases, which are already deaf,—where the connective tissue changes have already taken place—it is theoretically and

practically useless to expect absorption and restoration of function by any procedure on the nose. It is a matter of chagrin to find, after promising a patient with a deviated septum who suffers from deafness a recovery of his hearing, and after subjecting him to the financial and time loss of the operation, that he is no better than he was before. Undoubtedly, attention to the ear itself and attention to the Eustachian tube might accomplish the same result without subjecting such a patient to the operative procedure on the nose or pharynx.

Dr. Kopetsky said that though he followed Dr. Phillips closely he could not follow all of his views. In children, in spite of the removal of the adenoids and the tissue in Rosenmueller's fossa acute and chronic infections of the ear develop. It is well to pause occasionally in recommending the removal of tonsils and adenoids on account of the so-called effect on the ear; for he has seen cases put as near the normal as possible and these eventualiy develop deafness,—so it cannot be said that the removal of the so-called caustive factors in the nose will greatly tend to the restoration of the hearing of the deaf. The nose might require surgical treatment on its own account, but Dr. Kopetsky thought that the effects produced by intra-nasal surgery among those afflicted with deafness was very much over-estimated, by both the laity and the profession.

Dr. Danziger, admitting the importance of the anatomical deformities in the treatment of otitic disease, said that, in a number of cases where children suffer from chronic rhinitis without any other deformity, it must be remembered that the mucous membrane of the naso-pharynx is only a part of the respiratory system. The mucous membrane is liable to infection in certain constitutional conditions as in the congenital vulnerability of the structure in the presence of tuberculosis and lues. An early Wassermann is sometimes more important than surgical procedures.

Dr. Phillips had spoken of treating acute catarrhal otitis by inflation. He could not entirely agree with what the Doctor had said, for to have a catarrhal otitis there must be an inflammatory edema in the Eustachian tube due to infection. Dr. Phillips had said that if you do not introduce infectious material into the middle ear you will not get infection there. If you blow infected air into the ear, how can you avoid infection?

The Chairman said that the discussion was rather getting away from the topic of discussion, which was "Intranasal operations in relation to the hearing,"—The points to be discussed are chiefly, the beneficial or non-beneficial results to the hearing resulting from intra-nasal operation.

Dr. Miller inquired what time Dr. Thurber would advise that operation should take place in these questionable cases.

Dr. Herzig suggested that in case an operation is necessary for the cure of catarrhal ear affections the submucous resections should be preferred whenever possible to a turbinectomy. The regulation of an ante-proteid (red meals) diet is of the greatest importance after these operations as it greatly diminished the congestion.

Dr. Carter said he wished to call attention to one point in regard to the after-treatment of intra-nasal operations, as regards the injury to the ear and the quick recovery from these operations. If we can control the capillary circulation in the mucous membrane of the nose, we can

prevent any complication that might affect the ear. He had directed attention to this point some years ago and had first suggested the use of vaseline gauze and described its preparation. Used in the nose after operations, this would do more than anything else that he knew of to limit the second and prevent the third stage of inflammation. It would limit the stage of retardation of the capillary flow and prevent the stage of stasis. If this can be done, intra-nasal operations are quickly recovered from and middle-ear complications are not apt to occur.

Dr. Carter said that he was glad to see that his original suggestion had been widely adopted and that vaseline gauze was now generally used as a packing after intra-nasal operations.

Dr. Phillips said he had hoped that some one would have spoken on the question of operating on the nose during the time when an acute inflammatory process was going on in the nose or ear.

Dr. Carter replied that he thought every rhinologist recognized that principle, and that no one would dare to touch a nose or throat during an acute inflammation.

Dr. MacKenty said that in acute otitis media the removal of the adenoids was usually a justifiable procedure. The removal of the tonsils is not necessary at that time. Often the removal of the adenoids in an acute condition will serve to promote drainage and will not do harm, if done properly, which always means not with the curette.

In regard to the objection to the use of the curette in the naso-pharynx: If used at all, it should be used with the greatest care. Intra-nasal operation should certainly never be done unless urgent during acute conditions.

Dr. Thurber said that the purpose of the paper *was* to provoke discussion. One of the chief difficulties in children is to obtain good nasal drainage. Secretions held stagnant by the apposition of septum and turbinates soon become thickened and often purulent and thus do harm to the ears.

Dr. Thurber, replying to Dr. McCoy, said that it was his rule to remove just enough of the septum, by one of the several methods, to permit good drainage, trusting to further growth to enlarge the nasal cavities and, at the same time, not removing so much that growth of the septum would be interfered with.

In regard to operating for adenoids in acute otitis media: Each case must be judged on its own merits. No one would think of operating on a case if the ears were doing well but in the cases where there is evident delayed resolution, adenoids would probably have to be removed. In chronic ear infections, the case is different. One has waited for resolution without results and the indications for removing adenoids or any mass that is obstructive, are clear enough.

He agreed with Dr. Oppenheimer that the naso-pharyngoscope gave a better view of the Eustachian tubes than any other instrument yet at hand. The fault with the post-nasal mirror is that it has to be placed so far below the level of the nasal floor that the true relations of the post-nasal structures are not well seen.

In regard to the use of the adenoid curette: The curette can and should be used as delicately as one would use a uterine curette. It is possible

to educate the touch so that one is able to tell when all the adenoid tissue has been removed. The object is not to use such great force that the whole naso-pharynx is denuded of membrane.

He agreed with Dr. Kopetzky in what he said about giving promises of cure in chronic otitis media. The changes in the middle ear are there to stay and comparatively little can be accomplished by treatment. He had mentioned letting the turbinates alone unless there are marked bony enlargements. Too many turbinectomies have been done in the past. No one can make set rules for intra-nasal operations. It is a question of using good judgment upon each case.

Tumors of the Carotid Gland and Their Relation to the Larynx: With Report of Case and Microscopic Section. DR. JAMES G. CALLISON, (by invitation).

DISCUSSION.

DR. MACKENTY said that the Dr. Callison's paper was most timely, for very few of us in making differential diagnoses of tumors of the neck think of the carotid body as being a possible cause. It has not been presented before as Dr. Callison has treated it. The surgery of the carotid body is certainly very difficult, and if not undertaken early in the growth before the malignancy has involved the arteries death from unilateral cerebral anemia or recurrence may be expected.

In operating on this case, he opened the neck extensively and found a large mass under the deep fascia. Going down on it, he lifted the whole contents of the anterior compartment of the neck including the sympathetic nerve and everything in the sheath of the vessels. It was split open, but it was found that it would be impossible to remove it without removing the vessels and nerves, so he simply removed a portion of the growth and sewed the neck with drainage.

Unfortunately in the next bed of the ward was a case of erysipelas, which he also developed. A few weeks later he had a very severe hemorrhage, and on opening the wound it was found to be from an open common carotid artery. This was tied and the patient died a day later. Hemiplagia occurred.

The presence of tumor in the carotid location is suspicious. These growths are benign at first, as a rule, and of slow growth; mobility is another point. All one can do is to surmise that it is a tumor of the carotid body. The examination of a pathological specimen is necessary; even then the diagnosis is difficult as shown in our case.

Dr. MacKenty said that Dr. Callison had done a great deal of work in compiling this paper, probably the best that had been done anywhere, and that he had presented the subject exhaustively, which was of great interest and value, giving as it does the subject up to date.

DR. CALLISON said that the tumor seemed to occur at all ages, the youngest patient being 7 years of age and the oldest, 76, most occurring in middle life. The patient in the particular case cited was 41 years of age. The tumor shows a very mild form of malignancy and is best left alone.

Report of a Case of Bronchial Carcinoma With Skin Metastasis, Terminating in Tracheal Stenosis and Laryngeal Edema. DR. OTTO GLOGAU.

Mr. M. N. presented himself in February 4, 1913, at my Clinic at St.

Marks Hospital. Previous history: Patient suffered ten years ago from pleurisy, but was otherwise always healthy until about six months ago when his present ailment set in. He started to cough, brought up some phlegm and was somewhat short of breath when he over-strained himself. About four months ago he noticed a swelling at the left side of the neck, that gradually increased in size and spread backward and downward. Soon afterward he noticed two red patches at the center of the chest. Every day some more of these red patches would appear, till almost the entire chest, neck and back was covered by them. The swelling at the left side of the neck within the last few days became so big that it interfered with his breathing and within the last day almost choked him. He has lost in weight considerably during the last few months.

Present state: The patient is 50 years of age and somewhat emaciated. He is gasping for air and appears to be almost choking. For the following description of the status of the skin of the patient I am indebted to Dr. L. Oulmann, Dermatologist of the German Dispensary, who was kind enough to see the case with me after his admission to the hospital: "Around the larynx, the skin is somewhat infiltrated and over the chest covered with light-red patches of different sizes from lentil-form to one by two inches in irregular form. At the left side of the neck a tumor can be felt, which is adherent to the underlying tissues and to the great vessels as well as to the skin. This tumor is of about apple-size, presses on the larynx, and pushes the latter together with the trachea over the middle line towards the right side; from the larynx to the sternum the neck shows hard infiltration. The chest as well as the back are covered with the above-mentioned red patches, which extend in front down to the eighth rib, in back yet further downward, but more sparingly. The left side is more covered by these patches than the right one, but the lesions present extend over the middle line in front and back. The lesions show marked infiltration and are slightly raised. Some of them are covered with a crust, which is hard and adherent to the skin, and when scraped shows a weeping epidermis. Around the margins the enlarged capillaries can be followed up into the normal-looking skin."

Inspection of the larynx by both larygeal mirror and the pharyngoscope revealed an almost total occlusion of the entrance of the larynx, due to an excessive edema of the ary-epiglottic folds and of the arytenoid cartilages. The left cheek, right above the tumor, from the inside showed a toughy edema and infiltration of the size of a walnut. As the patient was in danger of life from suffication, he was immediately admitted to St. Marks Hospital and I performed a tracheotomy. As my tentative diagnosis was malign tumor of the neck causing by pressure laryngeal edema, I decided to do a superior tracheotomy; thus supposedly opening the trachea right beneath the stenosis. In order to reach the trachea, the above-described tumor had to be divided. On account of the size of the superimposed tumor, the trachea was very deeply situated and was reached only after the separation of a mass of very friable and excessively bleeding tissue. The trachea had been pushed beyond the middle line for about one-half an inch. The trachea was incised and a middle-sized canula introduced. The lumen of the trachea was, however, so narrow

that a thin canula had to be resorted to. It became apparent that the entire trachea was stenosed due to the pressure of the tumor which extended very much deeper and further downward than could be expected by its outward appearance. The depth of the wound, i. e. the distance from the incision of the skin to the incision of the trachea was about two inches. The canula had, therefore, to be introduced and fastened at the bottom of the wound and the wound had to remain open. Should the wound have been closed and the canula, as usual, been fastened to the skin, the canula, due to the width of the tumor mass, would not have even reached the tracheal incision. Around the neck of the canula the wound was packed with gauze and the opening of the canula covered with gauze dipped into warm saline solution. The house-surgeon was instructed to remove and clean at intervals the inner tube of the canula. During the day the patient felt greatly relieved.

Dr. L. Oulman, concluding from his above-mentioned report, was kind enough to diagnose the case from the appearance of the skin in the following way: "The mammae appear normal and there are no nodules present. The latter fact excludes cancer en cuirasse, the former a primary carcinoma of the mammae. The extensive involvement of the skin without tumor formation of any size excludes sarcoma, while angio-sarcoma of such large involvement never appears without some bleeding into the skin, never would be covered with crusts, and would show a different taint. Therefore the *diagnosis is made of secondary or metastatic carcinoma of the skin due to a primary carcinoma either of the neck, if the tumor there was a primary carcinomatous degenerated cyst, or from some primary cause in the chest, with a secondary metastasis of the neck and of the skin.*

Pieces of skin, including the corium and subcutaneous tissue were removed for microscopic examination and sent to the Pathological Laboratory of the Woman's Hospital.

The day following the operation I was informed over the telephone that the patient was almost suffocating. I hurried to the hospital and found the patient in great distress. He did not breathe at all through the tracheal canula. Inquiring from the house-surgeon whether the inner tube had been removed and cleaned as ordered, I learned that this had been done a few times and even a very short time before my arrival. Upon inspection of the wound, I found the canula apparently in the tracheotomy wound and was therefore at a loss to account for the patient's failure to breathe through it. I removed the canula and inserted it again, with the same untoward result. The patient in the meantime grew worse and worse. Searching the bottom of the wound I accidentally pulled the dislocated trachea towards the middle line and suddenly noticed tracheal breathing from a place quite remote from the spot where the house-surgeon and I had inserted the canula. Through thorough inspection and inquiry the mystery was solved in the following way: Before performing the tracheotomy I had pulled towards the middle line the trachea that had been dislocated by the pressure of the tumor and made the central incision. The inserted canula prevented the trachea from following its tendency to return into its dislocated position. When the house-surgeon tried to remove the inner tube in order to clean it,

the canula slipped out of the tracheal wound; the trachea thereupon returned into its dislocated position, thereby twisting somewhat about its long axis and turning the centrally located incision laterally. The house-surgeon tried to reinsert the canula and after many trials mistook an excavation at the bottom of the wound, at its inferior angle, for the tracheal incision and inserted the canula into it. In trying to find out the reason for the patient's not breathing through the canula, I first made the same mistake until I accidentally detected the displacement and consequent occlusion of the tracheal incision. After the insertion of the canula into the tracheal incision the patient, of course, felt much relieved.

Bearing Dr. Oulmann's tentative diagnosis of primary carcinoma within the chest in mind, it occurred to me to examine the patient bronchoscopically through the tracheal incision. After thorough cocainization, I introduced a narrow bronchoscopic tube, attached to Bruening's bronchoscope through the tracheal incision down to the bifurcation and first into the right and then into the left main bronchus. The lumen of the trachea and the right bronchus was very narrow, and that of the left bronchus almost entirely occluded. One inch beyond the bifurcation, I detected within the left bronchus a whitish-yellowish mass of apparently decayed tissue which I diagnosed as carcinoma. I thought of removing bronchoscopically a piece of the tissue for microscopic examination, but the condition of the patient grew so bad that I had to withdraw the bronchoscope. Within a few hours following the bronchoscopic examination the patient became so short of breath that I was called to the hospital. It was evident that the tracheal canula could not give him relief, as the entire trachea below it was stenosed on account of the tumor and infiltration of the adjacent tissues. In order to prolong the life of the patient, I introduced a small bronchoscopic tube into the right bronchus and left it in place instead of a canula. The patient felt much relief for a short time, but the bronchoscopic tube became clogged up and had to be removed and inserted again after being cleaned. The insertion of the bronchoscopic tube in this case was very hard, as the tracheal incision was two inches below the level of the skin and it was only by resorting to great strength that the trachea could be stretched sufficiently. The procedure, of course, was very painful to the patient. While the bronchoscopic tube was removed he did not get any air at all and almost choked. After each insertion of the bronchoscopic tube he recovered for some time. The oxygen tank was attached to the bronchoscopic tube, but the improvement was inconsiderable. By resorting to the bronchoscopic tube the life of the patient was prolonged for twenty-four hours. He died on February 9, 1913, at 6 p. m. from suffocation. Permission to post-mortem was refused by the relatives. They only consented to the removal of the larynx.

The specimen of the larynx shows an extreme edematous infiltration of this organ. The ary-epiglottis folds, the arytenoid cartilages, the false vocal cords and the recussus Morgagni are transformed into a huge mass of edematous tissue that occlude the larynx. The larynx was surrounded and encroached upon by a mass of infected glands forming the above-mentioned tumor.

A few days afterwards the following pathological report was received from Dr. Emil Schwarz, Associate Pathologist of the Woman's Hospital:

"The specimens of skin show a normal but slightly atrophied epidermis. The subcutis shows a very loose hyperemic, hyaline degenerated connective tissue, which becomes denser around the otherwise normal sebaceous glands. Within this loose subcutaneous tissue there are imbedded within the lymph vessels numerous smaller and larger nests of polygonal cells of about 15-20 mikron diameter. There are sometimes strands, sometimes tubular cell collections. The lymph vessels appear to be infiltrated by these large protoplasmatic cells that are closely packed together in an epithelial-like manner without intervening stroma. The cells for the most part are rather large and possess deeply-stained, rounded and ovoid nuclei, and rather abundant finely granular cytoplasm. The cell-boundaries are indistinct. In some of the larger islands the tissue is necrotic in the central portion. Some dilated lymph-vessels show regular infarcts of these cell-complexes, with vacuolization here and there. The microscopic sections allows of the conclusion that we have to deal with a metastatic carcinoma of the skin, propagated through the lymph channels of the skin and probably originating within the respiratory tract. The metastatic carcinoma is caused by an infarct of the lymph glands from the original tumor and to subsequent retrograde propagation over the subcutaneous tissue along the lymph channels. The differential diagnosis between sarcoma cutis multiplex idiopathicum (kaposi), endothelioma metastaticum, mycosis fungoides, and leucemic skin tumors rests with the character of the cells, being doubtlessly epithelial, with the locality of the affected lymph glands and the secondary spreading over the left thoracal region, the absence of leucemia and the lack of regularly developed mycosis fungoides eruptions.

From the localization of the affection and from the form of the cells (most probably derived from cylinder cells) I judge that the metastasis of the skin in this case is due to carcinoma of the respiratory tract, probably to bronchial carcinoma."

Dr. Schwartz was kind enough to search the literature for similar cases. Reitman (*Arch. f. Dermatologie*, Vol. 90, p. 359) reports about forty cases where carcinoma of the internal organs spread over large areas of the skin. About half of the cases are metastasis of carcinoma ventriculi, while 15 per cent are metastasis of carcinoma of the lungs. Recklinghausen mentions the lymph vessels as propagating such metastatic carcinomata of the internal organs. Cases of skin metastasis (carcinoma ventriculi) are furthermore reported by Kreibich (*Med. Klinik*, Vol. 39, 1909); Offergold, (carcinoma uteri) (*Zeitschr. f. Geb. u Gynk*, Vol. 29, 1909) and Montier and Clarri (*Arch. de. med. prov.*, Vol. 32, 1910). A case similar to the one described in this article is reported by Stropseni (*Zeitschr. f. Krebsf.*, Vol. IX, 1910). The interesting feature of this case is that the primary carcinoma had been diagnosed in three different independent ways. The dermatologist, from the appearance of the skin changes, diagnosed the case as secondary skin metastasis caused by a carcinoma within the chest. The writer succeeded in locating the primary carcinoma bronchoscopically and the pathologist, from the appearance of the metastatic cells, concluded that the primary carcinoma must be situated within the bronchi. The pressure of the infarcted glands forming a large tumor together with that of the infiltrating secondary skin metastasis brought about a stenosis of the trachea and finally an excessive edema of the larynx, that could not be relieved by tracheotomy. The dislocation of the trachea and consequently of the tracheal incision, furthermore the prolongation of the life of the patient by inserting a bronchial tube instead of a tracheal canula add to the interest of the case.

I wish to express my thanks to Dr. L. Oulmann for the clinical diagnosis of the skin affection and to Dr. E. Schwartz for the pathological report.

DISCUSSION.

DR. MAYER said that if was to be regretted that the lateness of the hour prevented the discussion of some of the interesting points suggested by this case. He congratulated Dr. Glogau on the opportunity of reporting such a case.

PHILADELPHIA LARYNGOLOGICAL SOCIETY.

Regular Meeting, February 18, 1913.

DR. ROSS HALL SKILLERN, CHAIRMAN.

Anatomy of the Static Labyrinth. DR. M. STROUSE.

Within the petrous portion of the temporal bone, there is located two special sense-organs, that of hearing and the so-called equilibrium function (derived from the epiblastic layer) and all contained within the so-called labyrinthine capsule. We speak of an osseous and membranous labyrinth. The osseous labyrinth is composed of compact bone, and is divided into three essential parts; the cochlea anteriorly, semi-circular canal posteriorly, and vestibule intermediately. The cochlea is a spiral tube, 28 to 30 mm. in length, located between the internal auditory canal and tympanum; in the human making two and one-half turns, and terminating in a blind end; at the basil whorl it communicates with the vestibule, is 2 mm. in diameter, and gradually decreases to its superior extremity. The basil whorl is above the jugular bulb, and separated from it by a very thin lamina of cancellous bone; internal carotid artery in front and external to the cochlea, and also separated by a thin layer of spongy bone.

Semi-circular canals: Three in number, external, superior and inferior. Each canal has an enlargement at one end, called ampulla; ampulla of superior canal lies above that of the external canal, and that of inferior canal, inferiorly and medianward. The canals have five openings into the vestibule, external canal two, and ampullar and nonampullar opening; superior and posterior canals have an ampullar opening, while at the non-ampullar end they unite and open conjointly into the vestibule. According to Shoenamann (Braun and Friesner) planes of angles of canals are very inconstant; external is rarely horizontal, the angle between external and posterior most constant. Canals form two-thirds of the circumference of a circle and are 7 to 8 mm. in diameter. External canal exposed on the median wall, and superior and posterior to facial canal, and therefore, an important surgical landmark in the mastoid operation; is seldom injured in operative procedure, but a favorite site for fistula in the suppurative process of middle ear.

The Vestibule: An irregularly rounded, bony cavity, 67 mm. in length, 3 to 4 mm. in width, 4 to 5 mm. in heighth, contents about 1 minum (Politzer) into which opens posteriorly and superiorly the three semicircular canals and anteriorly and interiorly the lowest cochlea whorl. On inner wall, a ridge; the crista vestibuli divides the vestibule into two recessus, ellipticus and sphericus; aqueductus vestibuli, and macula cribrosa, open into recessus ellipticus. Externally, oval window for footplate of stapes. Briefly, the osseous labyrinth lies within the petrous portion of the temporal bone and there are certain exposed portions,—posteriorly on the median wall, the prominent portion corresponding to

the convexity of the external canal, anterior to this the facial canal, containing the seventh nerve, then oval window for the foot-plate, finally the promentory corresponding to the cochlea, inferiorly the round window, the plane of which is at right angles to the median tympanic wall. On the superior surface eminentia arcuata marking convexity of superior canal. On superior median surface, internal auditory canal, for accommodating the internal auditory artery, and seventh and eighth nerves; immediately under this canal the aqueductus cochlearis and ductus perilymphaticus, and about 1½ cc. external of this the aqueductus vestibuli corresponding to location of saccus endolymphaticus. Membranous labyrinth corresponds in contour to osseous with one exception, in place of one vestibule we have two membranous sacs, utriculus in the recessus ellipticus and sacculus in the recessus sphericus. The sacculus is in communication with the membranous cochlea, through the ductus reuniens. The utriculus is in direct communication with the three semicircular canals by five openings. From the sacculus springs the ductus endolymphaticus, from the utriculus a short duct uniting utriculus with ductus endolymphaticus, called the ductus utriculo-saccularis. Bony canals about eight times the size of the membranous. Membranous ampulla almost the size of bony ampulla. Between membranous and bony labyrinth, the perilymphatic space containing perilymph, and its intracranial outlet is through the aqueductus cochlearis, where it spreads over the subarachnoid space. It is the avenue by which infection may reach the brain. Endolymphatic space is within the membranous labyrinth. Is a closed canal, containing endolymph, and its intra-cranial termination is called saccus endo-lymphaticus, located between the two layers of the dura at aqueductus vestibuli. The membranous canal contains three separate anatomic and functionating highly specialized sense organs, the first located in the cochlea, and called the organ of Corti. I will not describe it, as it belongs less to the symposium than the other two. Second, the crista ampullaris, three in number, one for ampullar end of each canal. Third, macula acoustici, two in number, one each for utriculus and sacculus. The crista ampullaris, as its name indicates, is a ridge and on the surface of which we find sense cells of neuro-epithelium, containing cilia, and alternating with supporting cells. The hairs of neuro-epithelium (about 20 to 25 microns in length) are held together by an adhesive substance, and surmounted by a cupola; the crista protrudes into the cavity of the ampulla, and is the organ which receives the impact of moving endolymph in the canal, physiologically taking place when we move our heads in curved lines. The macula acoustica is an eliptical area in close contact to membranous sac, containing neuro-ephithelium or special sense cells, alternating with supporting cells, on the surface of which is a gelatinous mass, containing crystals of calcium carbonate, or so-called odeliths (2 to 30 microns in diameter). It is by reason of the drag of these crystals en masse on the cilia of the cells which gives us the impression of our position in space (static function), and, too, our sense of direction of motion in straight lines, as distinct to the function of the semi-circular canals in curved lines.

Turning Test. DR. HERBERT M. GODDARD.

As a result of careful experiments, Barany developed an accurate method for the determination of the reaction of the semi-circular to turning. In order to make the examination the patient is placed in a revolving chair, and instructed to hold firmly so as to prevent toppling over. Some experimenters have the patient wear dark glasses, although that is not a requisite. The examiner holds a stop-watch in one hand and with the other turns the patient or has an assistant do the turning.

The turning should be made as nearly uniform as possible and should consume about two seconds for a complete turn, that is 360°. Turning ten times usually produces the maximum amount and duration of after-nystagmus.

When it is desired to examine for horizontal after-nystagmus to the right, we must turn the patient to the left. If we examine for rotary after-turning-nystagmus, to the right, the patient's head is inclined 90° forward and the patient turned to the left; after making ten complete turns, the patient is brought to a sudden stop when the examiner starts the watch and makes the observation. Just as soon as nystagmus ceases the watch is stopped. If the observations are correct the watch should record the exact duration of the after-nystagmus. If there is any doubt, it would be well to have the findings proved by repeating the act, providing the patient is not too much affected by first experiment.

The reaction of the semi-circular canals to turning is in proportion to the duration of the after-nystagmus. The average duration of after-turning-nystagmus is between 20 and 22 seconds for the horizontal, and between 23 to 26 for the rotary.

Barany, in some 200 experiments with normal, and others with affected ears but yet no complaining of vertigo, found the average duration of horizontal after-nystagmus after turning ten times to the left, forty-one seconds, and to the right, thirty-nine. Mackenzie in his article states he does not believe after-turning-nystagmus thoroughly reliable unless the patient has a fixed object straight ahead. Barany claims that duration of after-nystagmus diminishes after 50 years of age.

Right here I may add that it is claimed by Barany and Mackenzie that after-nystagmus varies according to the number of times the subject has been turned, but proportionately less where the turnings are less than ten and any greater number of turns than ten seems to diminish, rather than increase, the duration of after-nystagmus.

Barany refers to what he calls after-nystagmus which frequently occurs in patients who have turned twenty or more times; in these cases the subject shows, first, a very pronounced after-nystagmus in the usual direction, which ceases rather suddenly followed by a small excursioned nystagmus in the opposite direction to the after-nystagmus, that is in the direction of the turning which produced it.

Since we have learned the semi-circular canals of one side are capable of producing nystagmus to either side, it is of importance to know just how much the after-nystagmus to one side is due to the irritation of the same side, and how much to the irritation of the semi-circular canals of the opposite side.

Ewald's experiments have shown that mechanical forcing of the endolymph toward the ampulla of the horizontal canal produces nystagmus to the same side, while suction produces the opposite movement of the endolymph and with it the opposite nystagmus. In a normal case it is impossible by turning to produce endolymph of one side only.

Diagnosis of Suppuration of the Labyrinth. DR. GEO. M. COATES.

I desire to call attention to the etiology and pathology of this disease. In practically every case where the labyrinth is invaded by pyogenic micro-organisms the source of the infection is in the middle ear, either an acute or chronic suppurative otitis media. It is at times secondary to circumscribed or diffuse serous labyrinthitis, and is to be differentiated in its early stage from these two diseases. Once the inner ear has become infected its pathology is similar to that of an acute, and later a chronic middle-ear suppuration. There are two stages in diffuse suppurative labyrinthitis, the acute or manifest stage, and a chronic or latent stage. The history of the case is very important. The attack begins abruptly with total deafness, vertigo, nausea and loss of equilibrium. There are no febrile symptoms or pain. Spontaneous rotary nystagmus toward the sound side is always present, lasting usually several weeks. In the Weber test, the sound is lateralized to the healthy ear, while the Rinne is negative. Total destruction of the static labyrinth is shown by its non-reactibility to the caloric, turning and galvanic tests as demonstrated in other papers this evening.

DISCUSSION.

DR. GEO. W. MACKENZIE: At the request of those participating in the symposium, I have consented to demonstrate a few of the tests practiced in my examination of all cases of middle-ear suppuration. I believe the subject of the labyrinth and the diagnosis of labyrinthine diseases to be one of extreme importance to the otologist, in fact no one can practice otology successfully without an intimate knowledge of this subject.

I have with me a patient who has kindly consented to be subjected to the turning and the caloric tests. Aside from the fact that the patient has been operated on radically for chronic middle-ear suppuration of both sides, the history for our purpose is unimportant.

Let us try the turning-test first. Before doing so, it is important to observe carefully for any spontaneous nystagmus that may exist. My method is, as you will observe, to have the patient look straight ahead at some distant object, to relax as far as possible all tension on the extra-ocular muscles, under illumination of the eye-ball, and with the upper lids elevated. A casual observation for a few seconds may result in our not finding it even when present; therefore I would suggest examining for a longer period to observe a slight degree which may manifest itself by movements repeating themselves, say once in every 4 or 5 seconds. Some authors make examination by having the patient look to the extreme left and extreme right, and comparing the intensity and frequency of the movements. This method is inaccurate for the reason that the spontaneous nystagmus thus produced may be purely physiologic, and if the

patient looks more intently to one side than the other the observer may be misled into believing that the patient has spontaneous nystagmus of aural origin to the side where the patient looked more intently.

Turning the patient left ten times, with the head erect in order to produce an after-turning horizontal nystagmus to the right, we find the nystagmus quite pronounced and lasting but seventeen seconds. Therefore, we may conclude that the reaction to that side is diminished. We shall try the turing-test to the other side (rotation of the patient to the right), to ascertain the duration of the after-nystagmus to the left, which we find to be fourteen seconds. Again the figures are reduced. We may safely conclude, therefore, that the patient's left labyrinth is not functionating perfectly, else the duration would have been nearer twenty-four seconds.

Let us try turning the patient ten times, with the head forward 90° in order to elicit the duration of the after-turning rotary nystagmus to the two sides. Again we find the figures reduced to the two sides, but more so on the left, which only corroborates what we have previously found by turning the patient with the head erect.

This test, like that of the galvanic reaction test, is a quantitative one, in contra-distinction to the caloric test, which is purely a qualitative one. In other words, with the turning-test we are more or less able to tell varying shades or intensities of internal ear affections, whereas the caloric test tells us only of the presence or absence of total loss of function.

In making the caloric test we should first ascertain by otoscopic examination the presence or absence of certain conditions which may interfere more or less with the making of the tests for which we must make due allowance, to-wit: atresia of the canal, furuncles, foreign bodies cholesteatoma, large polyps, etc. Besides, we must observe the same rules as laid down above when making the turning tests, i. e., the presence or absence of spontaneous nystagmus, its direction and intensity. Let us begin by syringing the left ear with hot water. After a few minutes you notice, with the patient's head erect, rotary nystagmus to the left, often appearing late as in this case after the use of the water. The intensity of the reaction is usually less with the use of hot water than with cold for the reason that the difference between the normal body temperature and the hot water, as hot as the patient can tolerate, is less than the difference between the body temperature and cold water (say 50° F.). With the cold water in the right ear you observe a very pronounced rotary nystagmus to the right side, accompanied by some nausea. To cut short the duration of this reaction we may begin to neutralize with the use of hot water, the effect of which you observe is fairly prompt. To demonstrate the fact that the caloric reaction is due to currents of endolymph produced in the canals by changing the density of the fluids with the use of cold and heat, we shall try one other experiment.

Let us turn the patient's head laterally to the right. With the cold water syringed into the left ear you observe the patient manifests a pro-

nounced horizontal nystagmus to the left or same side; after observing it let us see what happens when we turn the patient's head to an upright position, almost immediately you observe that the nystagmus swings to the right or opposite side and becomes rotary in character. You will note that in all of these tests the patient was directed to look straight ahead. I wish to add that the nystagmus which is manifested while the patient is attempting to look straight ahead is always reliable, while that which can be observed only when the patient looks intently to the side is never reliable, and I would advise that you observe the same precautions. I appreciate your calling on me and am glad of the opportunity of making these demonstrations.

DR. ALEX. B. RANDALL: I have not made a very extensive use of the various tests given here this evening, as I find them exceedingly uncomfortable to the patient, and in those cases where it is particularly uncomfortable it is difficult to determine whether the result is obtained from hysteria or whether the trouble is genuine, and often the results are almost disastrous, and I have felt restrained in using these tests for that reason.

The fistula test which has been spoken of is one by which means we are able by pressure and suction to influence the internal labyrinth. I have seen time and time again individuals in a hysterical condition, who had never had suppuration of the ears, but who would drop over in the chair by even a deep finger pressure. So that while these tests are of great value, particularly in those cases where the functionating power is greatly lowered, it is very important to recognize whether the diseased condition remains or not.

BOOK REVIEWS.

Geschichte der Ohrenheilkunde. (History of Otology.) By PROF. DR. ADAM POLITZER, Vienna. Volume II (1850-1911), Pp. 484 with 29 photographs on 29 plates. Verlag Ferdinand Enke, Stuttgart, 1913. Price, M. 24.

The first volume of this splendid contribution to the history of otology by our esteemed teacher and eminent author, Hofrat Politzer, presented in chronological order the growth of otological science from its incipiency to 1850. A comprehensive review of Volume 1 was published in the December, 1907, issue of THE LARYNGOSCOPE.

The recently published second volume of this history of otology includes the active and more progressive period of our science from 1850 to 1911. This consists of a formidable volume of 500 pages and records the progress of modern otology, not only in chronological order, but in classified form, accompanied by an elaborate index of the most original work in every phase of the science that has been accomplished during this active period.

Of the eighteen sections of the first part, five are from the pen of Hofrat Politzer and thirteen by various teachers in the otological department of the Vienna University.

The first chapters on the "Anatomy of the ear," comprising the external and middle ear, are by Prof. G. Alexander and are presented in the usual minute and painstaking style of this able writer. Short chapters by Docent W. Kolmer on the "Historical Evolution of the Organ of Corti," and by Prof. Marburg on the "History of the Nervus Octavus," conclude the section on the antomy of the ear.

The section on the physiology of the ear by Prof. Kreidl and Docent Barany includes a detailed review of the evolution of the sound-conducting and sound-perceiving apparatus with special emphasis on the vestibular apparatus.

The physiology of the hearing is traced by Kreidl from the time of Mueller and Helmholtz and many of the theories and principles presented concerning the function of the drum membrane, ossicles and Eustachian tube; Barany offers in his subdivision on the "Vestibular Apparatus," a brief resume of the contributions of Flourens, Goltz and Ewald, and his own contributions from a diagnostic point of view. An historical resume of the problem of bone-conduction by Docent H. Frey concludes this section on the physiology of the organ of hearing.

One of the most important sections of this work is the one on "Pathological anatomy," by Hofrat Politzer. This begins with the pioneer work of Toynbee and his important published reports of post-mortem findings in 1659 otological cases and their careful analysis, and is closely followed by contributions of von Troeltsch and a monograph by Schwartze on the "Pathological anatomy of the ear," and valuable contributions by Profs. Habermann on "Tuberculosis" and Steinbruegge on "Pathological conditions of the labyrinth."

"Methods of examination," by Docent Kaufmann, "Diseases of the auricle and external auditory canal," by Docent Leidler, "Diseases of the drum membrane," by Prof. Pollak, "Historical development of catarrh of the middle ear, by Prof. Alt, "Middle-ear suppuration," by Prof. Gomperz constitute chapters 4-9, inclusive. The concluding paragraph of the histories of infectious diseases of the middle-ear cavity include contributions on tuberculosis, scarlatinal, morbillar, typhoid, influenzal and syphilitic invasions of the middle-ear cavity together with an important bibliography of this field are contributed by Hofrat Politzer.

Chapter 10 on the "History of the mastoid operation," and chapter 11 on "Suppuration of the Labyrinth," are interestingly elaborated contributions by Hofrat Politzer.

Prof. H. Neumann presents Chapter 12 on "Intra-cranial otitic complications," and an extensive monograph including extra-dural abscess, meningitis, brain abscess and sinus phlebitis with their respective comprehensive bibliographies.

In the next chapter on the "History of otosclerosis," Hofrat Politzer finds himself in an especially familiar field, for it was he who first directed attention to a primary affection of the labyrinth capsule as the etiological factor in the development of typical otosclerosis. This chapter is, therefore, given unusual prominence.

"The pathology of the labyrinth" is a well-written historical sketch by Prof. G. Bruehl. "Neurosis of the organ of hearing," by Dr. Conrad Stein, "Reflex neurosis," by Docent H. Frey, "Syphilis of the labyrinth," by Dr. Oskar Beck, and "Injuries to the ear," by Dr. Oskar Mauthner, are interesting contributions in consecutive order.

Prof. Victor Bremer writes the concluding chapter and treats this important question *in extenso*, cites the statistics and etiology of deaf-mutism refers to the epoch-making contributions of Meniere, Wilde, Moos and others, and records the development of the instruction for deaf-mutes with special emphasis on speech-reading as the latest and most effective method of instruction for this class of patients. z

The second part of this volume presents the development of otology in the various countries from 1850 to 1911. Much interesting data is furnished by the several contributors to this section and a chronologi-

cal record of the progress made in the different parts of the world presents good reference and a comprehensive review.

We cannot refrain from commenting on the rather unsatisfactory and incomplete record furnished by the collaborators for America. In a volume of this kind every country should receive due recognition. The activities in, and contributions to American otology during the past sixty years should, it seems, entitle us to more liberal consideration. The American Laryngological, Rhinological and Otological Society, which has been such an active and effectual factor in the development of otology in this country, is given but scant mention in a few lines under the caption of otological societies.

The record of otological instruction in the various universities and medical schools in the United States is quite incomplete. In the biographical sketches, grouped in cities, many well-known otologists are given but scant mention or are entirely omitted. The American editor is scarcely to be held responsible for these discrepancies and oversights as, in most instances, they were due to failure on the part of the otologists to fill out the blanks furnished them.

This volume completes Politzer's history of otology, a work that is destined to go down in otological literature as a permanent classic and valuable book of reference. The entire otological profession is under lasting obligations to our esteemed teacher and venerable colleague for placing such a work at its disposal.

Text-book of Diseases of the Nose, Throat and Ear for the Use of Students and General Practitioners. By FRANCIS R. PACKARD, M. D., Professor of diseases of the nose and throat in the Philadelphia Polyclinic Hospital and College for Graduates in Medicine, etc., Second edition, pp. 277 with 145 illustrations. J. B. Lippincott Company, Philadelphia, 1913. Price, $3.50.

The early appearance of the second volume of this practical text-book is the most conclusive evidence of its popularity and acceptability. We note in the revised edition that the chapter on diseases of the tonsils and adenoid growths with the new form of operation devised for the disposal of these neoplasms has been entirely rewritten. There has also been added a description of the processes employed in tracheo-bronchoscopy and esophagoscopy. The author adheres to the original purpose of this book, which was to furnish a practical working manual for the medical undergraduate and a ready reference book for the post-graduate in oto-laryngology.

The author's many years of experience as a post-graduate teacher and his practical, concise form of expression have resulted in one of the most practical manuals of oto-laryngology recently published.

Diseases of the Ear, Nose and Throat, Medical and Surgical. By WENDELL CHRISTOPHER PHILLIPS, M. D., Professor of Otology, New York Post-Graduate Medical School and Hospital, Surgeon to the Manhattan Eye, Ear and Throat Hospital, etc. Second revised edition; pp. 847, illustrated with 545 half-tones and other text-engravings, many of them original; including 31 full-page plates, some in colors. F. A. Davis Co., Philadelphia, 1913. Price, $6.00 net.

A rapidly exhausted first edition and the prompt appearance of a second edition is substantial testimony of the merits of this book. In this second edition the author has amplified the subject-matter of recently developed fields of oto-laryngology. Radiography of the mastoid process, a short article on status lymphaticus, a description of the electric naso-pharyngoscope, a paragraph on tonsil enucleation and the approved technic for its accomplishment, and the improved methods for the control of tonsillar hemorrhage are among the new themes presented in this second edition.

Diseases of the Ear. By PHILIP D. KERRISON, M. D., Professor of Otology. New York Polyclinic Medical School and Hospital, Junior Aural Surgeon to the Manhattan Eye, Ear and Throat Hospital, etc. Pp. 588 with 331 illustrations in the text and 2 full pages in color. J. B. Lippincott, Philadelphia, 1913. Price, $5.00.

It is a difficult problem for an author to publish an acceptable hand-book or text-book in a speciality of medicine or surgery unless that volume incorporates the personal experiences of the author and mainly reflects his originality and individuality.

Dr. Kerrison has successfully developed this feature in the present volume in that he discusses authoritatively from a rich practical experience and from a broad point of view the advanced and more modern problems of otology. Special emphasis is laid on lesions of the brain and meninges and the more difficult surgery and physiology of the labyrinth. Another important chapter is that on serum therapy including autogenous vaccines and the production of the Hiss leucocyte extract.

In the section on the operative surgery of the ear the excellent plan of illustrating each successive step of the important operations has been adopted. It is an excellent working-guide to the otologist who may not have the facility of a post-graduate clinic and more expert ear surgery close at hand. Many of the time-honored theories and therapeutic measures which no longer have any bearing on the practice of otology have been eliminated and the practical subject of this field has been made especially prominent.

Hand-book of Diseases of the Ear for the Use of Students and Practitioners. By RICHARD LAKE, F. R. C. S. Eng. Fourth edition revised and enlarged. Pp. 287 with 4 colored plates and 7 original illustrations. Wm. Wood and Company, New York, 1912. Price, $3.00.

There is but one derogatory criticism that may be made of Mr. Lake's fourth revised edition of his excellent "Hand-book of diseases of the ear" namely that it is too brief not only for a treatise or text-book but even as a manual for the under-graduate and practitioner.

The ripe experience of so eminent an authority on otology should be offered in more substantial form and with considerably more elaboration.

Notwithstanding the extreme brevity of the text the author has brought this revised edition strictly up to date, including a graphical though short description of the technic of the labyrinth operation, otosclerosis, effect of labyrinthine pressure, and the status of the semicircular canals in the functional tests.

Vicious Circles in Disease. By JAMIESON B. HURRY, M. A., M. D., Ex-president Reading Pathological Society. Second enlarged edition, pp. 280. J. & A. Churchill, London, 1913. Price, 7/6 net.

This monograph attempts to systematically analyse vicious circles in disease.

The author defines a vicious circle as a morbid process in which two or more disorders are so correlated that they reciprocally aggravate and perpetuate each other.

Vicious circles are classified into seven groups: 1. Organic circles. 2. Mechanic circles. 3. Infective circles. 4. Neurotic circles. 5. Chemical circles. 7. Artificial circles.

Much of this crystalized pathological and physiological data is closely correlated to our work in oto-laryngology and deserves careful perusal.